PEN PLOTTER

MP303 SERIES

SERVICE MANUAL

GRAPHTEC

MP303-UM251-02-9370

HISTORY OF REVISIONS

No.	Date issued	Description of revision	Page	Edition
1	2004.05.21	First printing	All	01
2	2004.12.01	Part numbers for the AC power cables corrected.	9-9	02

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1. GENERAL DESCRIPTION

1.1 Special Features

- **High-speed, high-quality plotting**

  A digital servo drive system and a 32-bit CPU combine to produce detailed plots with smooth curves at a maximum plotting speed of 700 mm/s (in all directions) and a mechanical resolution of 0.005 mm.

- **Various functions ensure clearly-defined plots**

  A wide variety of functions come standard to ensure clearly-defined plots, including the Auto Pen Cap function which prevents pens at the pen station from drying up when not in use and a mechanical soft-landing mechanism that extends the pen's lifetime while providing a quieter working environment. The plotting speed and pen force most suitable for the pen type being used can be easily selected from the control panel.

- **Upright installation possible**

  To conserve space, the plotter can be mounted on a pair of stands (provided as a standard accessory) for installation at a 60˚ angle.

- **Interface conditions are easily set**

  The interface mode (RS-232C serial or Centronics parallel or USB-compatible) is automatically selected when the plotter is connected to a computer via the respective interface connector.

  If the plotter is set to Auto RS-232C mode, you just need to send plot data from the computer; the RS-232C settings are automatically selected so no bothersome settings are required.

- **Interactive operation**

  Various functions can be set interactively by using the panel keys according to messages and prompts appearing on the display.

- **Vector sorting function**

  This function speeds up plotting by minimizing the distance the pen travels in raised status from the end point of one line to the starting point of the next line.

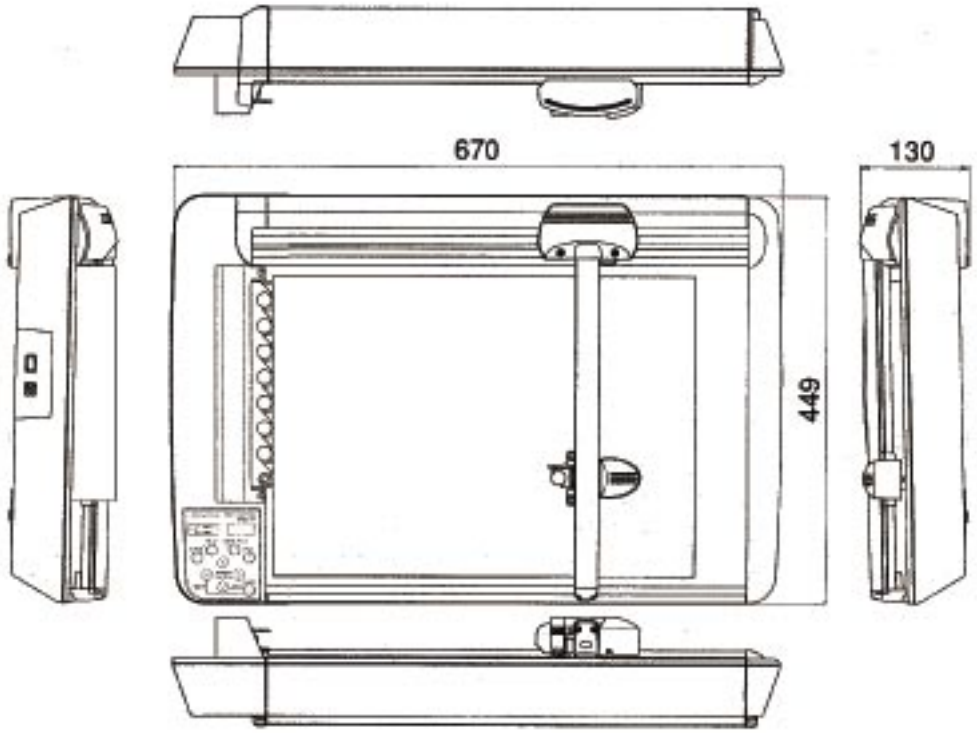
- **Pen sorting function**

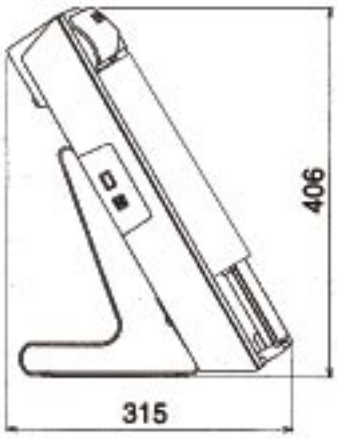
  To speed up plotting by reducing the number of pen exchanges required, this function reorganizes the sequence in which plotting is performed so that each color is completely plotted before selecting the next pen.

1.2 Specifications

Model no.	MP303-04
CPU	32-bit CPU
Configuration	Flatbed type
Drive system	Digital servo
Effective plotting area	EXPAND : 432 x 297 mm (17.0 x 11.7 in) ANSI B : 416 x 268 mm (16.3 x 10.5 in) ISO A3 : 404 x 285 mm (15.9 x 11.2 in) ISO A4 : 281 x 198 mm (11.1 x 7.8 in)
Maximum plot speed	70 cm/s
Mechanical resolution	0.005 mm (.0019 in)
Programmable resolution	GP-GL mode : 0.1/0.025 mm (.004/.001 in) HP-GL mode : 0.025 mm (.001 in)
No. of pens	8
Compatible ink pen types	Water based fiber-tip pens, Disposable ink pens (0.2, 0.3, 0.5, 0.7 mm), Refillable ink pens (0.2, 0.3, 0.5 mm), Ceramic pens (0.2, 0.3, 0.5, 0.7 mm)
Chart hold method	Electrostatic adhesion
Accuracy	Distance : within ±0.3% or ±0.1 mm, whichever is larger Repeatability : within 0.1 mm Perpendicularity : within 1.0 mm/297 mm Pen exchange : within 0.3 mm
Interfaces	RS-232C/Centronics/USB1.1
Command sets	GP-GL (MP-GL and FP-GL) HP-GL (HP7475 emulation)
Display panel	LCD (8 characters x 2 lines)
Buffer memory	2 Mbytes
Power supply	100 to 240 VAC ±10% 50/60 Hz
Power consumption	Within 45 VA
Operating environment	Temperature : +5˚C to +35˚C Humidity : 35% to 75% RH
External dimensions	670 mm (W) x 449 mm (D) x 130 mm (H)
Weight	Approx. 6.2 kg

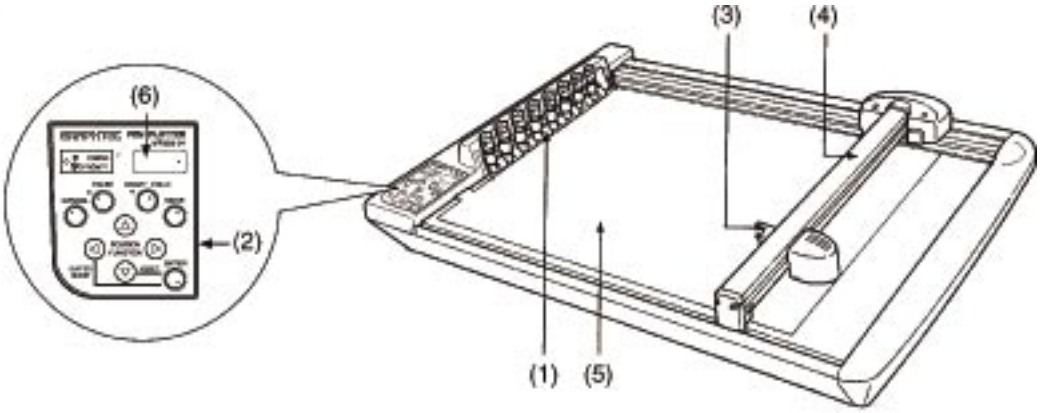
1.3 External Dimensions





2. DESCRIPTION OF PARTS

2.1 Description of Parts



(1) Pen station
Holds pens ready for use and is numbered consecutively from pen 1 through pen 8, from the bottom to the top.

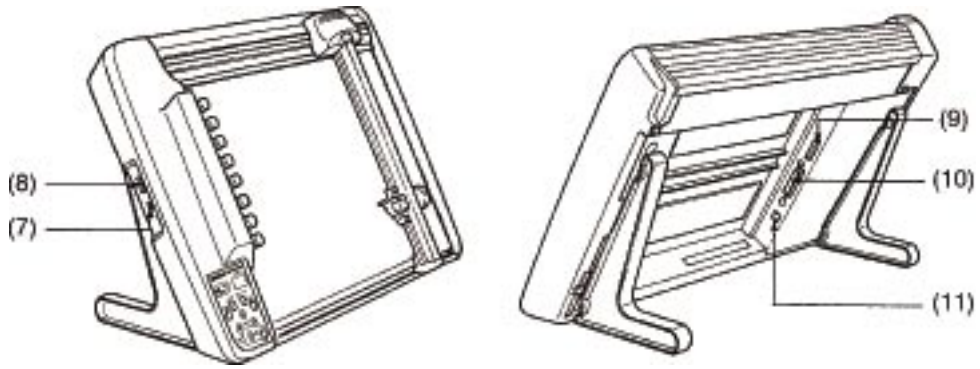
(2) Control panel
Contains the keys used for controlling the plotter's operations and the lamps which indicate the current plotter status.

(3) Pen carriage
Holds the currently selected pen.

(4) Y bar
This sliding bar travels in the X-axis direction to move the pen carriage and enable plotting.

(5) Writing panel
Holds the paper using an electrostatic adhesion panel.

(6) Display
Liquid-crystal display allows functions to be set interactively.



(7) AC inlet
Plug the AC adapter into this AC line inlet.

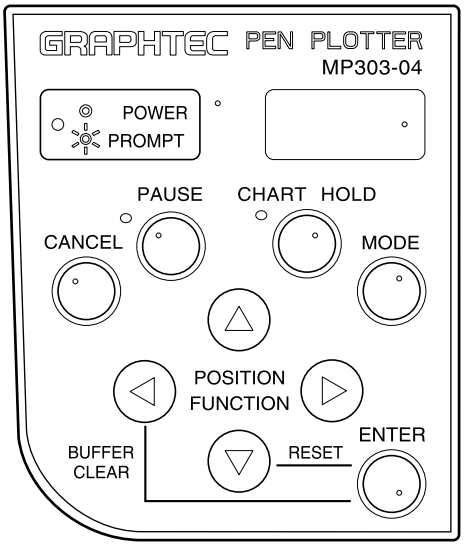
(8) Power switch
This switch controls the ON/OFF status of the plotter's power supply.

(9) RS-232C connector
To use the RS-232C serial interface, connect your computer to the plotter via this connector.

(10) Centronics connector
To use the Centronics-compatible parallel interface, connect your computer to the plotter via this connector.

(11) USB connector
To use the USB interface, connect your computer to the plotter via this connector.

2.2 The Control Panel



Keys

POSITION ..... Move the pen carriage in the direction indicated by each key.
These keys are also used to set functions at the display.

ENTER ..... Completes input of the function being set.

PAUSE ..... Press to temporarily stop plotting and press again to resume plotting.

CANCEL..... To cancel a setting shown on the display, press this key instead of the ENTER key.

MODE ..... Press to use the POSITION keys to move the pen carriage or to set function menus.

LEDs

CHART HOLD ..... Switches the ON/OFF status of electrostatic adhesion. After placing a sheet on the writing panel, press this key to secure the paper.

POWER/PROMPT .... Lights when the power is turned on.
Flickers to prompt you to press the ENTER key or to inform you that an error has occurred.

PAUSE ..... Lights to indicate that plotting is temporarily suspended.

3. RECOMMENDED PARTS LIST

No.	Part No.	Part Name	Description	Quantity	Remarks
1	035130123	Electrostatic Panel		1	Compatible with MP5300
2	773513500	High Voltage Board		1	Compatible with MP5300
3	618260300	Control Panel	PR312003	1	
4	500051951	AC Adapter	SA45-3129	1	
5	771826500	Main Board 303		1	
6	773513490	Control Board		1	Compatible with MP5300
7	691801540	Keyboard Flexible Printed Cable	FPC,05412	1	Compatible with MP5300
8	509000014	X Motor	TS3747N31ES	1	Compatible with MP5300
9	035132210	X Belt 1820		2	Compatible with MP5300
10	773513080	Relay Board	PR05406	1	Compatible with MP5300
11	508000015	X Home Sensor	GP1A53HR	1	Compatible with MP5300
12	508102285	Y Home Sensor	SW,SPPB/TYPE1	1	Compatible with MP5300
13	691801520	X Flexible Printed Cable	FPC,05410	1	Compatible with MP5300
14	795320716	Pen Station		1	Compatible with MP5300
15	035033051	Y Belt		1	Compatible with MP5300
16	509000015	Y Motor	TS3747N32ES	1	Compatible with MP5300
17	773513100	Pen Holder Assembly		1	Compatible with MP5300
18	509000035	Solenoid		1	Compatible with MP5300
19	035134081	Y Roller 10B		3	Compatible with MP5300
20	035132070	Y Roller B		1	Compatible with MP5300
21	105401090	Pen Flexible Printed Cable	FPC,05401	1	Compatible with MP5300

4. REPLACING THE MECHANISMS

4.1 Replacing the Rear Cover B

Disassembly

(1) Move the Y bar next to the pen station as shown in Fig. 4-1.

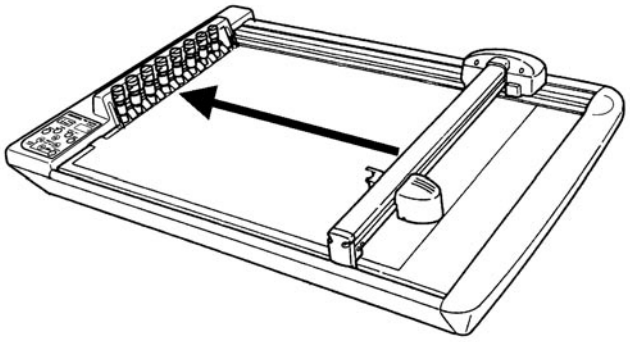


Fig. 4-1

(2) Place the plotter upside down on a table or other flat surface as shown in Fig. 4-2, making sure not to strike the Y bar or pen block against the surface.

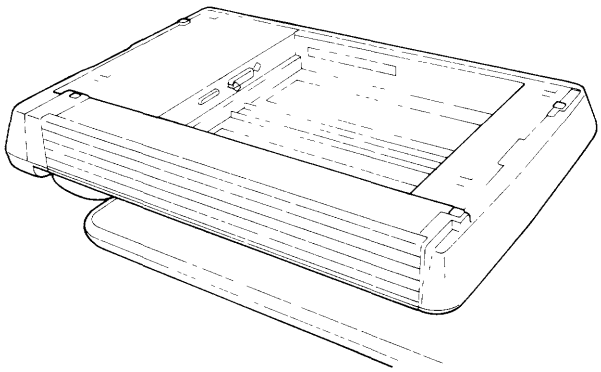


Fig. 4-2

(3) After removing the three M3 x 8 mm tapping screws and two M3 x 8 mm binding-head screws, remove the rear cover B (see Fig. 4-3).

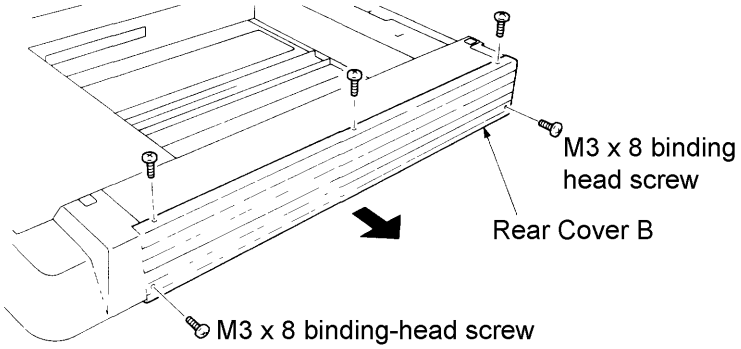


Fig. 4-3

Re-assembly

(4) Attach the rear cover B by performing the above “Disassembly” procedure in reverse.
Tightening torque: 4 kg / cm (M3 x 8 binding-head screws only)

4.2 Replacing the Right Cover

Disassembly

(1) Loosen the three M3 x 8 mm tapping screws securing the right cover, then remove one M3 x 8 mm binding-head screw from the rear cover B.

(2) Remove the right cover while turning it slightly toward you (see Fig. 4-4) to release its three hooks (see Fig. 4-5).

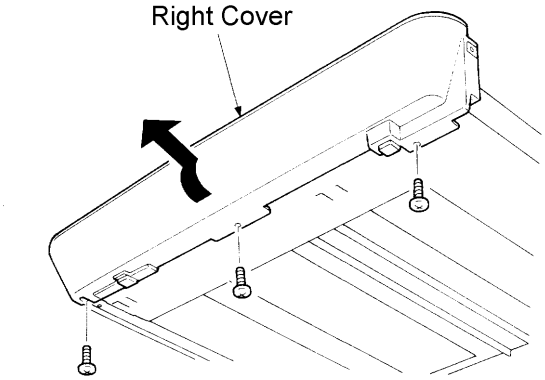


Fig. 4-4

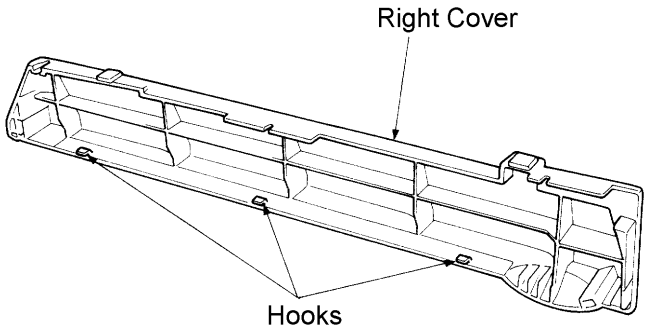


Fig. 4-5

Re-assembly

(3) To attach the right cover, insert its three hooks into the holes provided and then perform the above “Disassembly” procedure in reverse.

4.3 Replacing the Front Cover

Disassembly

(1) Remove the right cover.
(2) Remove the three M3 x 8 mm tapping screws.
(3) Slide off the front cover as shown in Fig. 4-6.

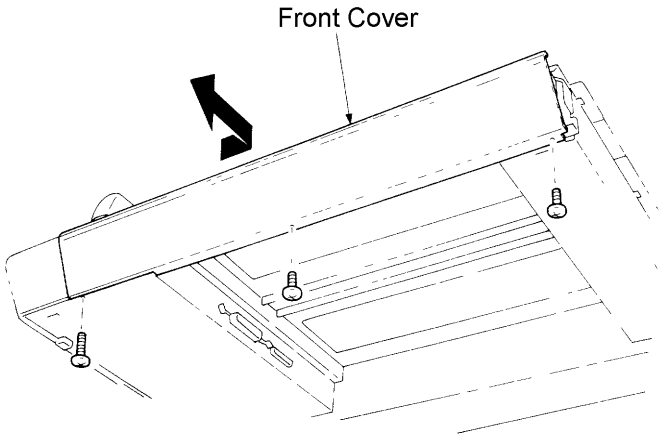


Fig. 4-6

Re-assembly

(4) To attach the front cover, perform the above “Disassembly” procedure in reverse.

4.4 Replacing the Top Left Cover

Disassembly

(1) Remove the black M3 x 12 mm tapping screw from the bottom of the top left cover (see Fig. 4-7).
(2) Remove the two M3 x 8 mm tapping screws from the top of the top left cover (see Fig. 4-7).
(3) Disconnect the flat cable, then remove the top left cover.

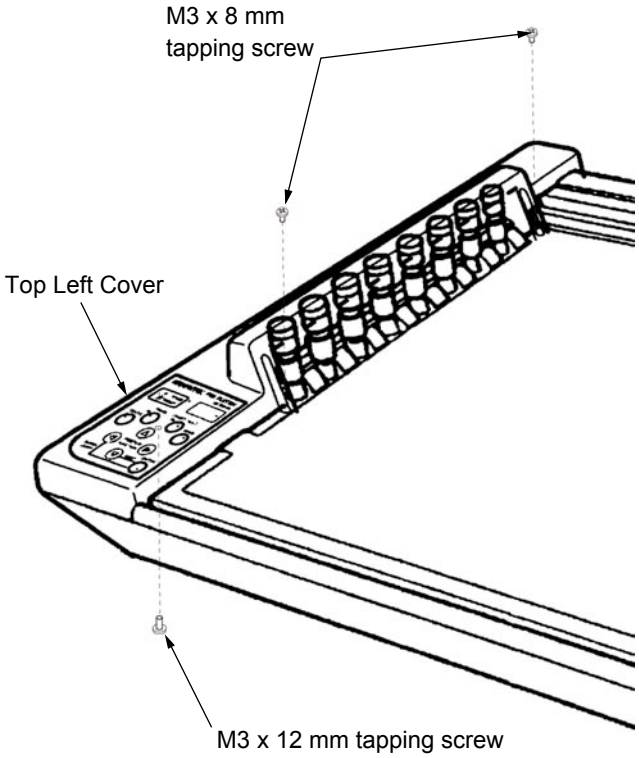


Fig. 4-7

Re-assembly

(4) To attach the top left cover, perform the above “Disassembly” procedure in reverse.

4.5 Replacing the Bottom Left Cover

Disassembly

(1) From the bottom panel, remove the six M3 x 8 mm tapping screws, and two black M3 x 5 mm tapping screws (see Fig. 4-8).

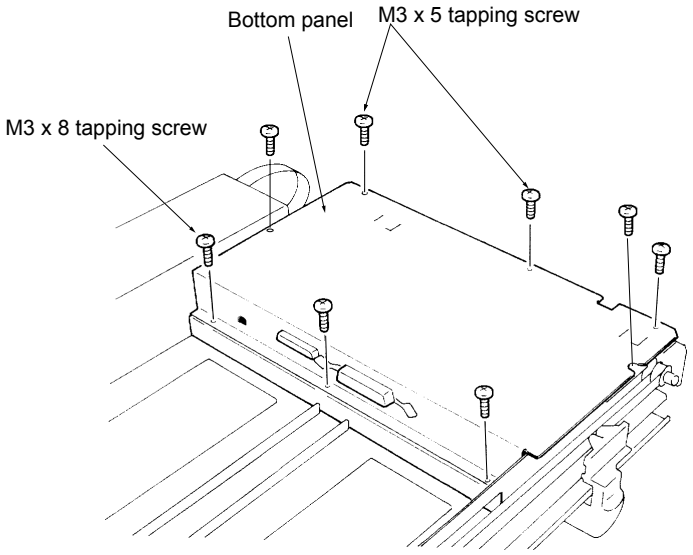


Fig. 4-8

(2) Remove the one M3 x 8 mm tapping screw from the rear cover B, then remove the bottom left cover (see Fig. 4-9).

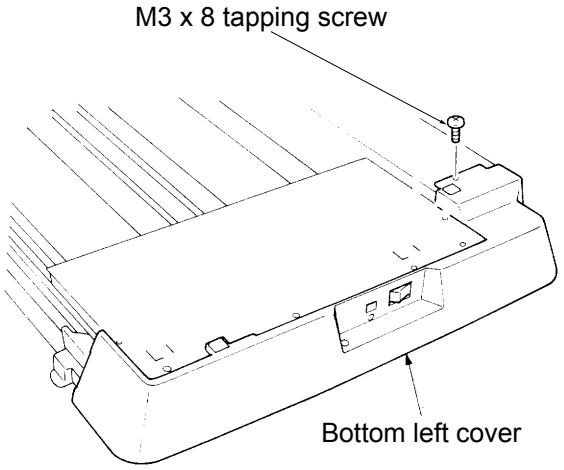


Fig. 4-9

Re-assembly

Caution: Be sure not to mix up the screws when replacing them.
Insertion of the wrong screws will damage the circuitry.

(3) To attach the bottom left cover, perform the above “Disassembly” procedure in reverse.

4.6 Replacing the Y Motor Cover

Disassembly

(1) Remove the two black M3 x 12 mm binding-head screws, then remove the Y motor cover (see Fig. 4-10).

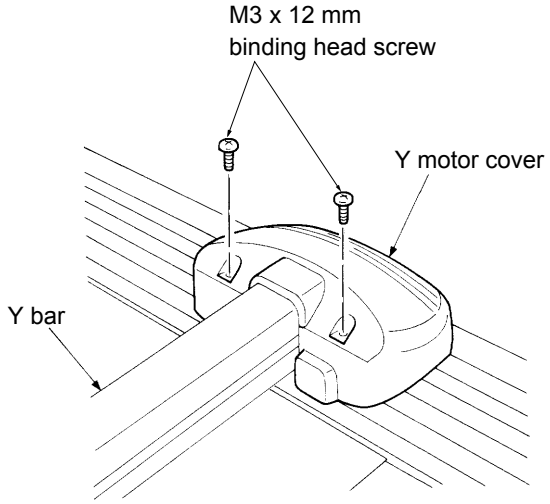


Fig. 4-10

(2) To attach the Y motor cover, perform the above “Disassembly” procedure in reverse.

4.7 Replacing the Solenoid Cover

Disassembly

(1) Remove the two M2 x 6 mm binding-head screws, then remove the solenoid cover (see Fig. 4-11).

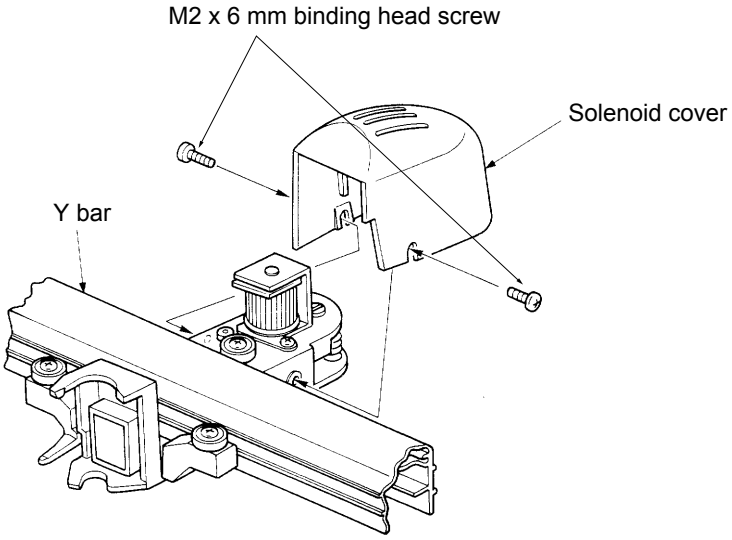


Fig. 4-11

(2) To attach the solenoid cover, perform the above “Disassembly” procedure in reverse.

Caution: Ensure that the solenoid cover does not contact the Y bar.
Fig. 4-12 shows an example of an incorrectly attached solenoid cover.

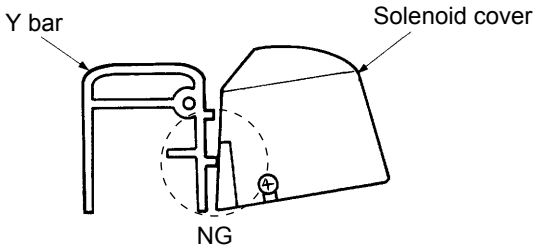


Fig. 4-12

4.8 Replacing the Y Bar Cover

Disassembly

(1) Place an A3 size sheet of paper on the plotter's writing panel to avoid scratching it.

(2) Remove the two black M3 x 12 mm tapping screws securing the Y bar cover (see Fig. 4-13), then remove the Y bar cover.

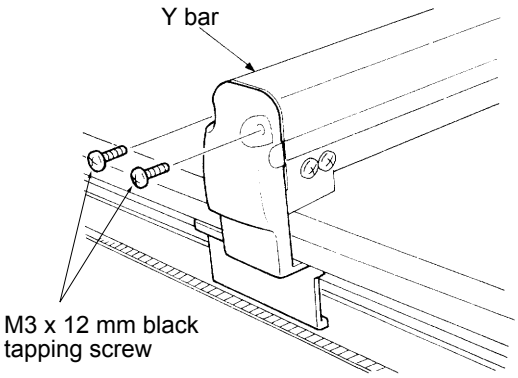


Fig. 4-13

Re-assembly

(3) To attach the Y bar cover, perform the above "Disassembly" procedure in reverse.

4.9 Replacing the X Belts

After the X belts are replaced, the X belt tension and perpendicularity precision must be adjusted.

Disassembly

(1) Remove the rear cover B, right cover, front cover, and top left cover.
(2) Loosen the two M3 x 6 mm binding-head screws securing the tension bracket (see Fig. 4-14) to loosen the X belt.
(3) Remove the X belts.

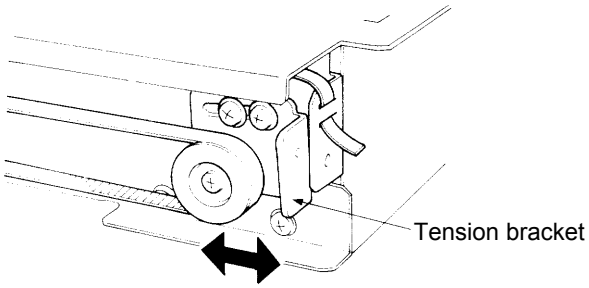


Fig. 4-14

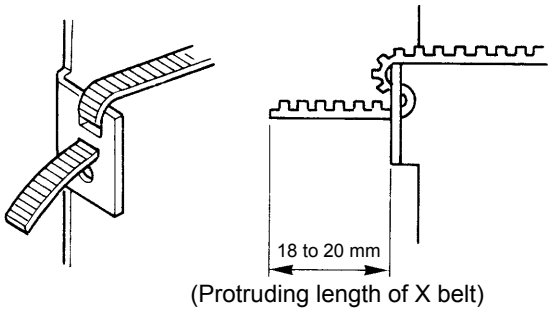


Fig. 4-15

Re-assembly

(4) Pull both ends of each X belt to the length indicated in Fig. 4-15.
(5) Attach the X belts to the corresponding pulleys.
(6) Adjust the X belt tension (see Section 5.1, “Adjusting the X Belt Tension”).
(7) Adjust the perpendicularity precision (see Section 5.5, “Adjusting the Perpendicularity Precision”).

4.10 Replacing the X Motor

After the X motor is replaced, the X belt tension and perpendicularity precision must be adjusted.

Disassembly

(1) Remove the X belts.
(2) Remove the bottom panel assembly and bottom left cover.
(3) Disconnect the X motor cable from the main driver board.
(4) Loosen the two M3 x 4 mm double-point screws from the coupling of the M shaft (see Fig. 4-16).

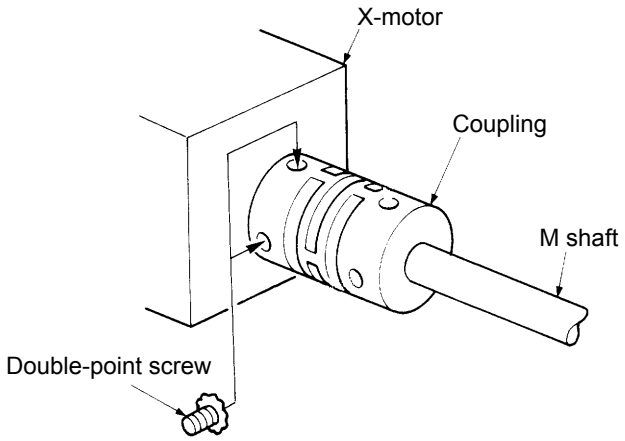


Fig. 4-16

(5) Remove the two M3 x 6 mm binding-head screws securing the X motor, then slide off the X motor.
(6) Remove the drive pulley from the X motor.

Re-assembly

Caution: The double-point screws in the X drive shaft's coupling are easily breakable and should be tightened with care.

The tightening torque must not exceed 2 kg / cm.

(7) To mount the X motor, perform the above "Disassembly" procedure in reverse.
(8) Mount the X belts.
(9) Adjust the X belt tension (see Section 5.1, "Adjusting the X Belt Tension").
(10) Adjust the perpendicularity precision (see Section 5.5, "Adjusting the Perpendicularity Precision").

4.11 Replacing the Y Bar

After the Y bar is replaced, the Y bar height, Y belt tension and perpendicularity precision must be adjusted.

Disassembly

(1) Remove the Y motor cover.
(2) Remove the Y bar cover.
(3) Loosen the two black M3 x 4 mm binding-head screws securing the Y pulley bracket (see Fig. 4-17).

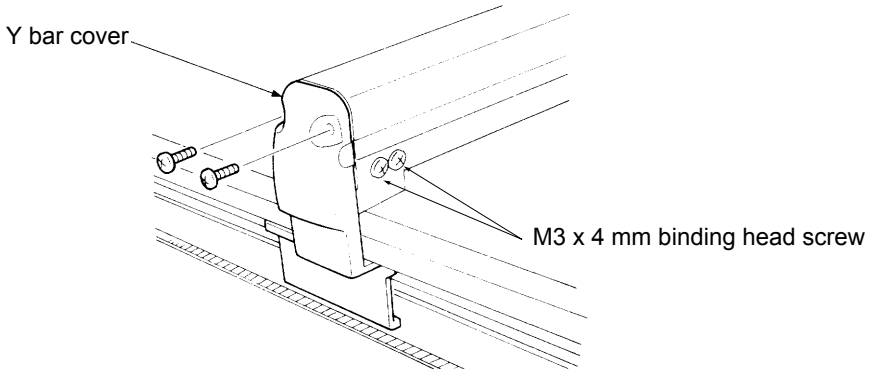


Fig. 4-17

(4) Remove the rubber holder securing the pen FPC (Flexible Printed-Circuit) cable to the X roller bracket, then disconnect the Y FPC cable from the relay board and separate it from the X slider.
(5) Remove the Y belt (see Section 4.12, “Replacing the Y Belt”).
(6) Remove the two M3 x 12 mm tapping screws securing the Y bar to the X slider, then remove the Y bar (see Fig. 4-18).

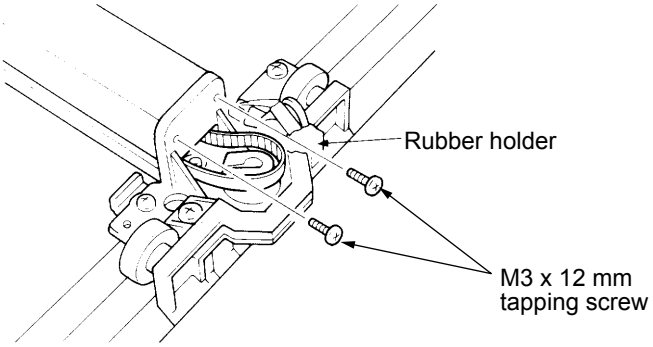


Fig. 4-18

(7) Slide the pen block assembly off the Y bar.
(8) Slowly peel the Y FPC cable off the Y bar, being careful not to damage the cable.

Re-assembly

(9) To mount the Y bar, perform the above “Disassembly” procedure in reverse.
(10) Adjust the Y bar height (see Section 5.3, “Adjusting the Y Bar Height”) so that the gap between the Y bar and X rail is about 11.6 mm.
(11) Adjust the perpendicularity precision (see Section 5.5, “Adjusting the Perpendicularity Precision”).
(12) Adjust the Y belt tension (see Section 5.2, “Adjusting the Y Belt Tension”).

4.12 Replacing the Y Belt

After the Y belt is replaced, the Y belt tension and X rollers must be adjusted.

Disassembly

(1) Loosen the M3 x 6 mm tapping screw at the X roller adjustment bracket (see Fig. 4-19).
(2) Remove the two black M3 x 4 mm binding-head screws securing the Y pulley bracket, then remove the Y pulley bracket.
(3) While slightly raising the Y bar toward you, slide the Y slider assembly off the Y bar (making sure not to damage the Y FPC cable).
(4) Remove the Y belt from the Y slider (see Fig. 4-20).

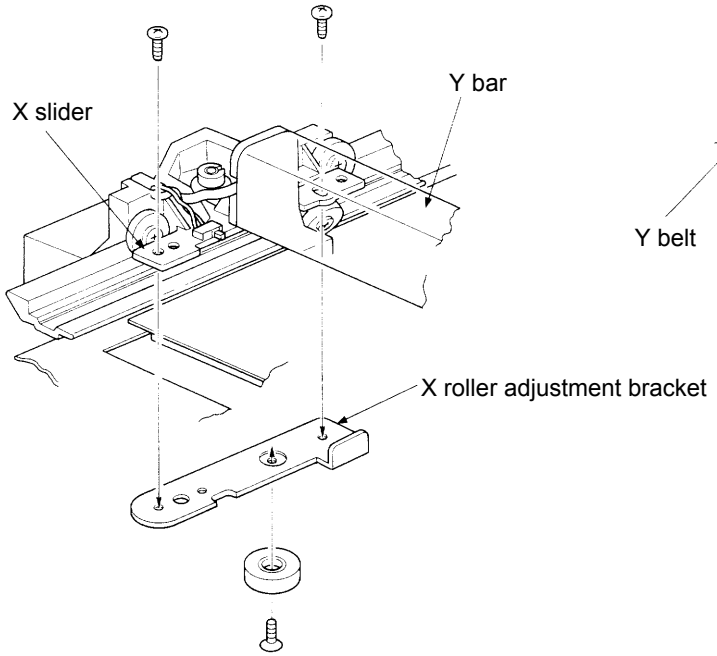


Fig. 4-19

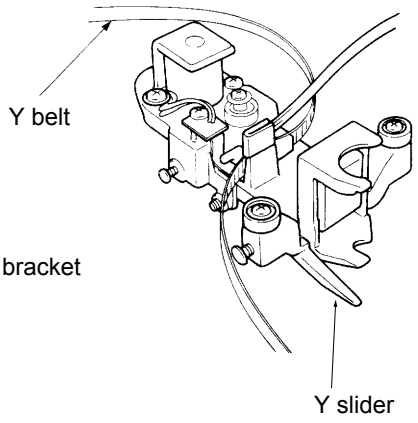


Fig. 4-20

Re-assembly

(5) Attach the Y belt to the Y slider.
(6) Mount the Y slider and Y pulley bracket onto the Y bar.
(7) Adjust the Y belt tension (see Section 5.2, “Adjusting the Y Belt Tension”).
(8) Attach the Y bar cover.
(9) Adjust the X rollers (see Section 5.6, “Adjusting the X Rollers”).

Note: Check the Y FPC cable to ensure that it is undamaged.

4.13 Replacing the Y Motor

After the Y motor is replaced, the X rollers, X belt tension, and Y belt tension must be adjusted. Next, run the pen retrieval test to check that pens are properly exchanged.

Disassembly

(1) Remove the rear cover B and Y motor cover.
(2) Remove the relay board, then disconnect the Y motor cable from the relay board.
(3) Remove the top left cover, then push the X slider as far as possible in the -X axis direction (near the pen station).
(4) Remove the Y bar cover.
(5) Remove the X belt closer to the back of the plotter.
(6) Loosen the Y belt.
(7) Remove the two M3 x 6 mm tapping screws securing the X roller adjustment bracket assembly, remove the X roller adjustment bracket assembly (see Fig. 4-21), then shift the entire Y bar assembly in the +Y direction.

Note: Be careful not to scratch the X rail.

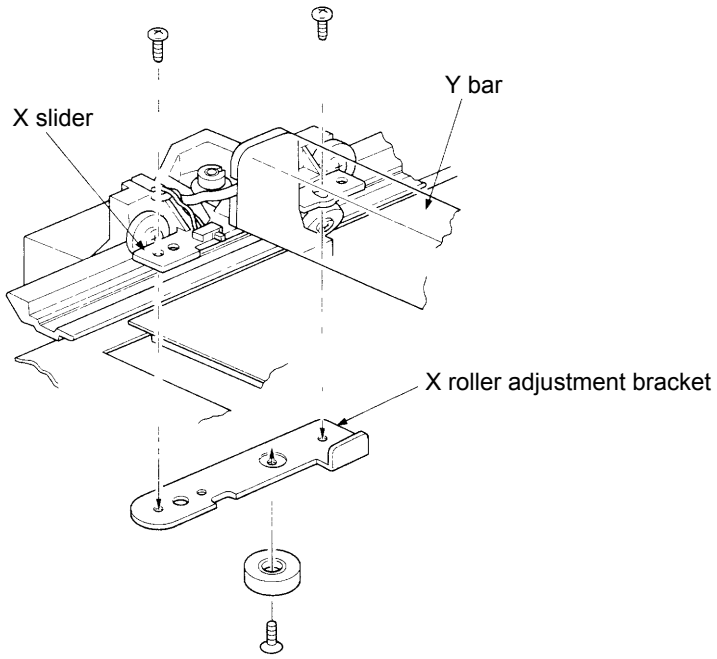


Fig. 4-21

(8) Remove the two M3 x 6 mm binding-head screws securing the Y motor, then remove the Y motor.
(9) Remove the Y drive pulley from the Y motor.

Re-assembly

(10) To mount the Y motor, perform the above “Disassembly’’ procedure in reverse.
(11) Adjust the X rollers (see Section 5.6, “Adjusting the X Rollers”).
(12) Adjust the Y belt tension (see Section 5.2, “Adjusting the Y Belt Tension’).
(13) Adjust the X belt tension (see Section 5.1, “Adjusting the X Belt Tension”).
(14) Run the pen retrieval test to check that pens are properly exchanged (see Section 6.7 , “The Test Modes”).

4.14 Replacing the Y FPC Cable

After the Y motor is replaced, the Y bar height and perpendicularity precision must be adjusted.

Disassembly

(1) Disconnect the Y FPC cable from connector J2 on the relay board.
(2) Remove the Y bar.
(3) Remove the M2 x 6 mm binding-head screw securing the Y FPC cable to the Y slider (see Fig. 4-22), then use a soldering iron to detach the pen solenoid's lead wires from the Y FPC cable.

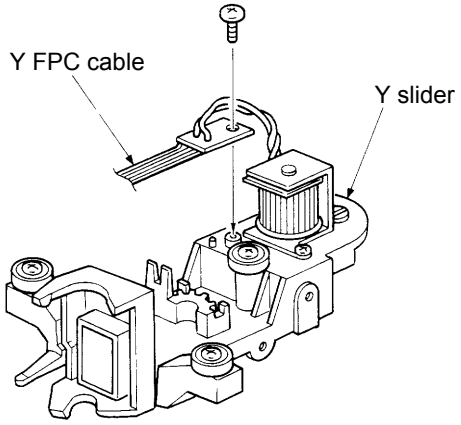


Fig. 4-22

(4) Slide the Y slider assembly off the Y bar.
(5) Remove the Y FPC holder bracket (which is secured by black adhesive).
(6) Peel the Y FPC cable off the Y bar.

Re-assembly

(7) Fold the Y FPC cable as shown in Fig. 4-23, and wrap a piece of filament tape (about 25 mm long) around the folded section. Attach the Y FPC cable to the Y bar with double-sided tape as shown in Fig. 4-24. To prevent the folded section of the Y FPC cable from lifting up, attach a piece of filament tape as shown in Fig. 4-25.

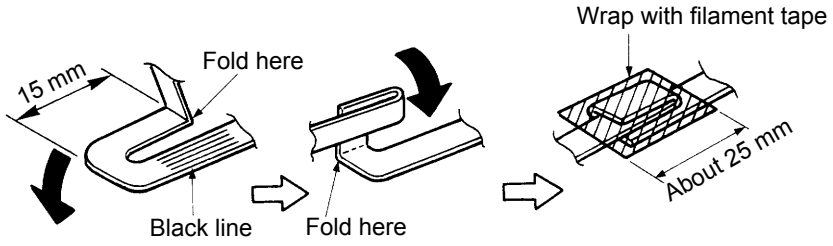


Fig. 4-23

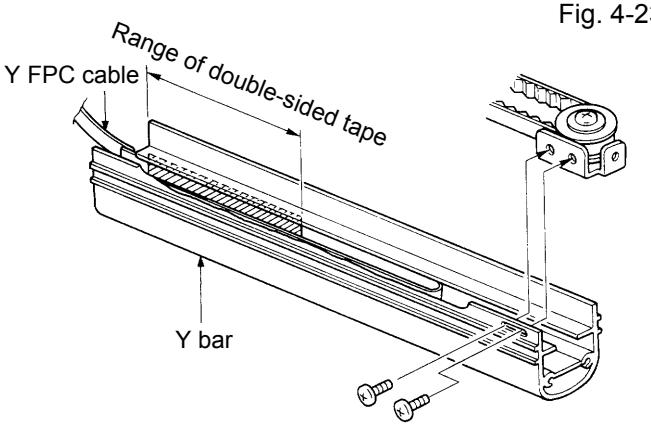


Fig. 4-24

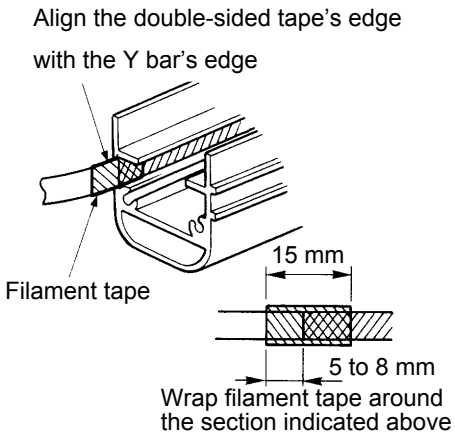


Fig. 4-25

(8) Process the Y FPC cable as shown in Fig. 4-26.

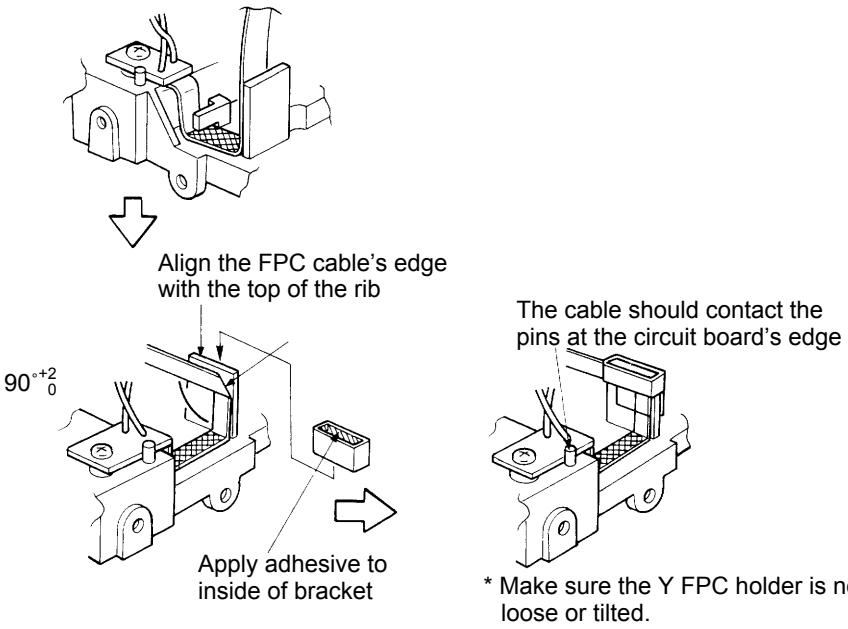

Align the FPC cable's edge
with the top of the rib
90°+2 0
Apply adhesive to
inside of bracket
The cable should contact the
pins at the circuit board's edge
* Make sure the Y FPC holder is not
loose or tilted.

Fig. 4-26

(9) To mount the Y FPC cable, perform the preceding "Disassembly" procedure in reverse.
(10) Adjust the Y bar height (see Section 5.3, "Adjusting the Y Bar Height').
(11) Adjust the perpendicularity precision (see Section 5.5, "Adjusting the Perpendicularity Precision").

4.15 Replacing the Pen Solenoid

After the pen solenoid is replaced, the pen force must be adjusted.

Disassembly

(1) Remove the solenoid cover.
(2) Remove the M2 x 6 mm binding-head screw securing the Y FPC cable to the Y slider.
(3) Remove the two M3 x 6 mm binding-head screws securing the pen solenoid to the Y slider (see Fig. 4-27).

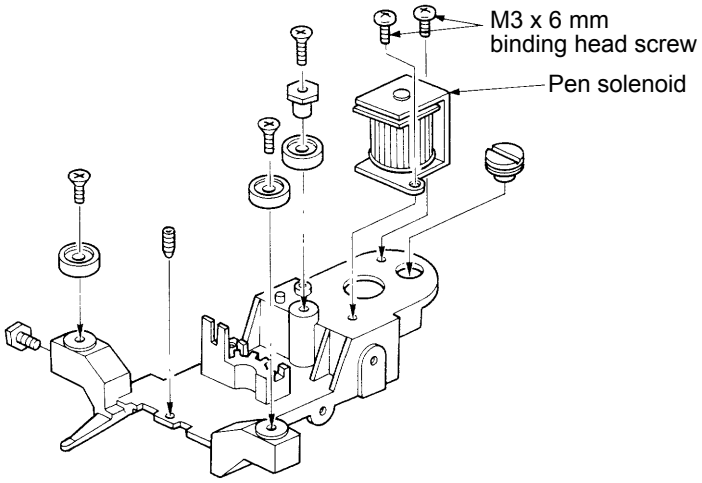


Fig. 4-27

(4) Use a soldering iron to remove the solder between the Y FPC cable and the pen solenoid, then remove the pen solenoid.

Re-assembly

(5) To mount the pen solenoid, perform the above "Disassembly" procedure in reverse.
(6) Adjust the pen force (see Section 6.6, "Adjusting the Pen Force").

4.16 Removing the Bottom Panel Assembly

Disassembly

(1) Push the Y bar next to the pen station as shown in Fig. 4-28.

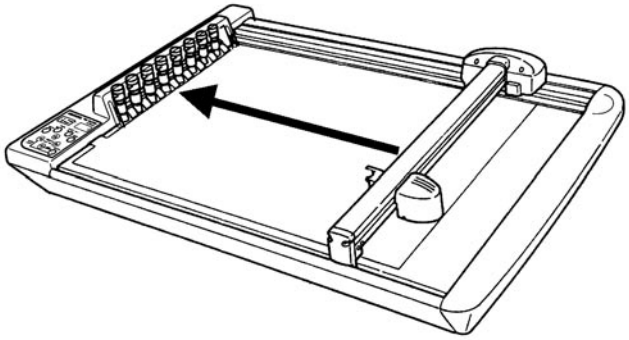


Fig. 4-28

(2) Place the plotter upside down on a table or other flat surface as shown in Fig. 4-29, making sure not to strike the Y bar or pen block against the surface.

(3) Remove the six M3 x 8 mm tapping screws and two M3 x 5 mm tapping screws securing the bottom panel assembly (see Fig. 4-29), then remove the bottom panel assembly.

Caution: Be sure not to mix up the screws when replacing them.
Insertion of the wrong screws will damage the circuitry.

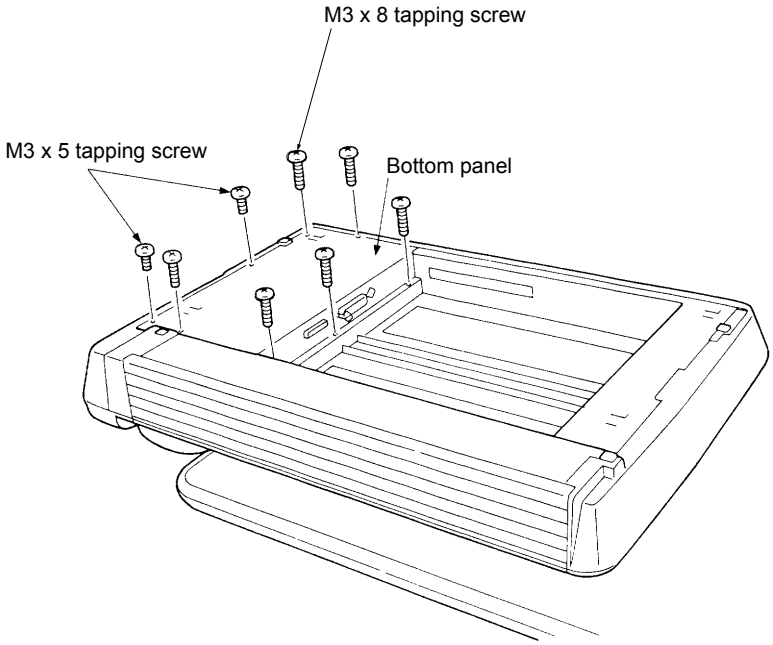


Fig. 4-29

(4) Disconnect all the FPC cables, connector cables, etc. from the main board.

5. MECHANICAL ADJUSTMENTS

5.1 Adjusting the X Belt Tension

(1) Remove the rear cover B, right cover, and front cover.

(2) Push the Y bar to the left next to the pen station.

(3) Remove the two black M3 x 12 mm binding-head screws from the Y motor cover and insert one into each tension bracket as shown in Fig. 5-1. Next, loosen the two M3 x 6 mm binding-head screws (with plain washer) at each tension bracket by about a half turn.

(4) To adjust the X belt tension, adjust the position of the tension brackets using the screws added in Step (3) so that, when a tension gauge (150 g maximum) is used to cause a 10 mm displacement in the X belt at the position indicated in Fig. 5-2, the force becomes 100 g (±20 g).

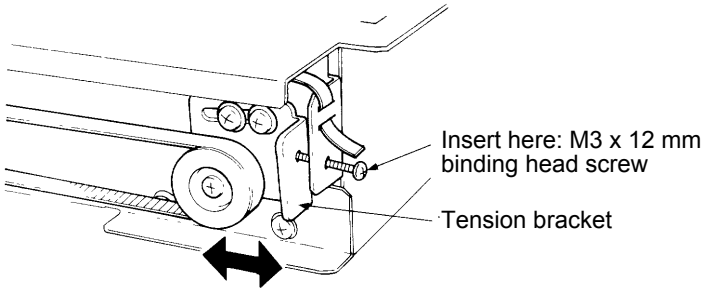


Fig. 5-1

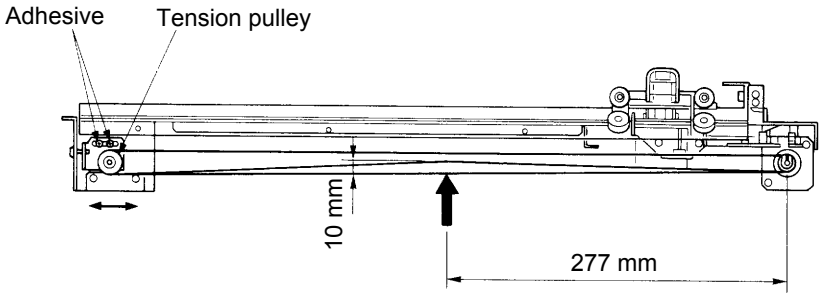


Fig. 5-2

(5) After adjustment is completed, tighten the two M3 x 6 mm binding head screws (with plain washer) at each tension bracket and secure them with adhesive, then remove the M3 x 12 mm binding head screw inserted in each tension bracket in Step (3) and replace them in the Y motor cover.

(6) Attach the rear cover B, right cover, and front cover.

5.2 Adjusting the Y Belt Tension

(1) Remove the Y bar cover.

(2) Loosen the two M3 x 4 mm binding-head screws securing the Y pulley bracket by about a half turn (see Fig. 5-3).

(3) To adjust the Y belt tension, pull the Y pulley bracket using a push-pull gauge and then tighten the screws loosened in Step (2) at the point where the pull force becomes 1000 g (±100 g).

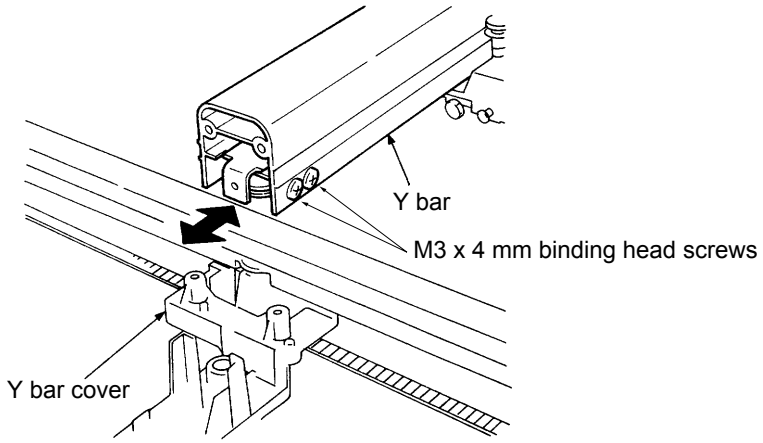


Fig. 5-3

(4) Attach the Y bar cover.

5.3 Adjusting the Y Bar Height

After the Y bar height is adjusted, the perpendicularity precision must be adjusted.

(1) Loosen the two M3 x 12 mm tapping screws securing the X slider to the Y bar as shown in Fig. 5-4.

(2) Adjust the gap between the Y bar and X slider to about 11.6 mm, then tighten the two screws loosened in Step (1) while making sure that the Y bar is not tilted.

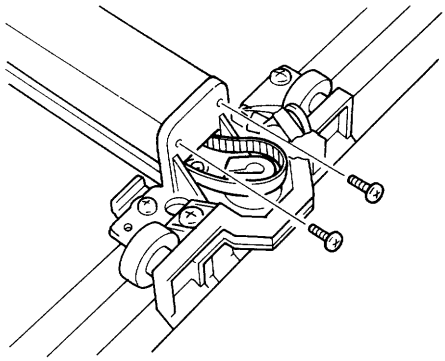


Fig. 5-4

(3) Adjust the perpendicularity precision (see Section 5.5, “Adjusting the Perpendicularity Precision”).

5.4 Checking the Perpendicularity Precision

(1) Attach a 0.2 mm ceramic pen and load a sheet of thin paper.

(2) Lower the pen and use the POSITION keys to manually plot the quadrilateral shape shown in Fig. 5-5.

(3) As shown in Fig. 5-6, fold the sheet in half so that the X-axis lines overlap.
Check the perpendicularity precision based on whether or not Line B deviates from Line A.

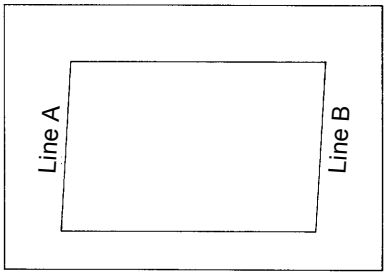


Fig. 5-5

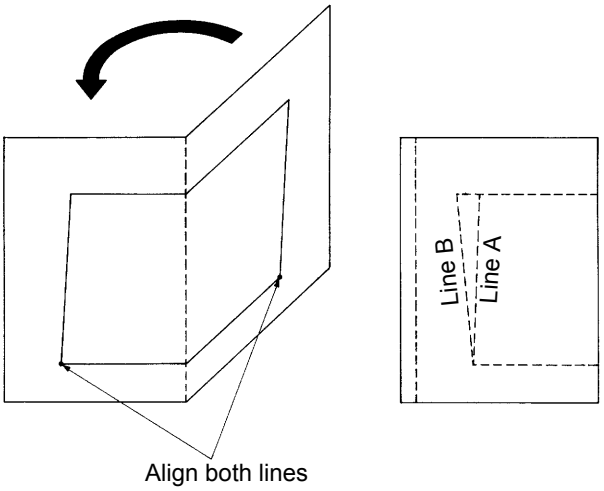


Fig. 5-6

(4) If Line B deviates from Line A when the paper is folded so that both X-axis lines overlap (see Fig. 5-7), tilt the Y bar toward Line B at half the angle of such deviation.

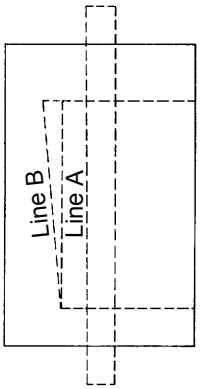


Fig. 5-7

5.5 Adjusting the Perpendicularity Precision

After the perpendicularity precision is adjusted, the X rollers must be adjusted.

(1) Remove the Y motor cover and rear cover B.

(2) Remove the top left cover, then loosen the two M3 x 4 mm double-point screws in the coupling (see Fig. 5-8) to free the M shaft.

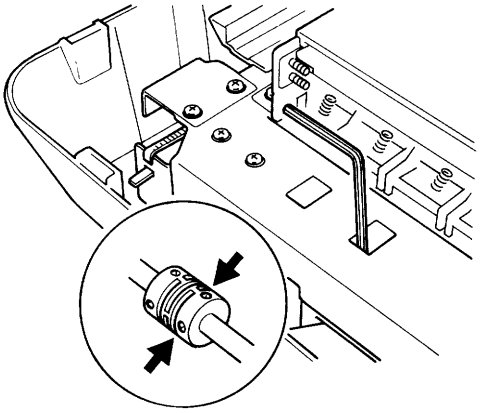


Fig. 5-8

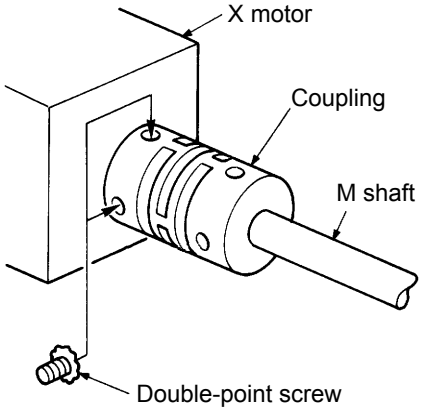


Fig. 5-9

(3) Loosen the two M4 x 6 mm toothed binding head screws securing the X roller bracket to the X slider (see Fig. 5-10).

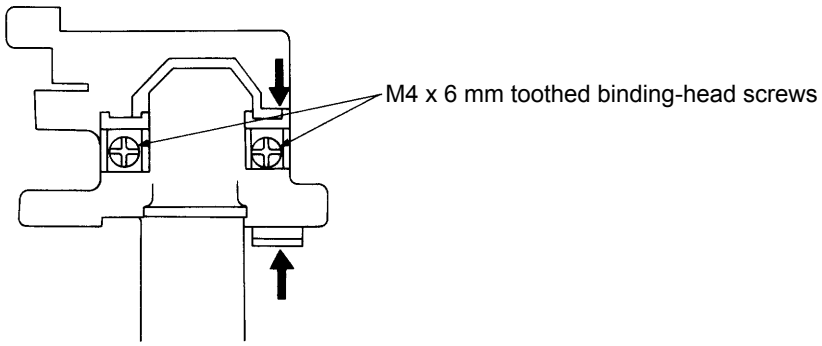


Fig. 5-10

(4) Slide the Y bar assembly so that it is parallel to the right edge of the writing panel, then tighten the two M4 x 6 mm toothed binding head screws.

(5) Adjust the X rollers (see Section 5.6, “Adjusting the X Rollers”).

(6) Tighten the two M3 x 4 mm double-point screws in the coupling, making sure that the torque does not exceed 2 kg/cm.

(7) Check the perpendicularity precision (see Section 5.4, “Checking the Perpendicularity Precision”). If the perpendicularity precision is unsatisfactory, repeat Steps (2) and (3) above and finely adjust the position of the Y bar assembly in the direction of deviation, repeat Steps (5) and (6), then check the perpendicularity precision again. When the precision is satisfactory, proceed to Step (8) below.

(8) Attach the Y motor cover and rear cover B.

(9) Attach the top left cover.

5.6 Adjusting the X Rollers

(1) Remove the Y motor cover and rear cover B.

(2) Loosen the two M3 x 6 mm tapping screws securing the X roller adjustment bracket.

(3) While pulling the X roller adjustment bracket and X slider by a pull force of about 600 to 700 g in the directions shown in Fig. 5-11, adjust the pressure exerted by the X rollers. Tighten the two M3 x 6 mm tapping screws.

Manually turn the X slider's rollers one at a time to check that all rollers exert the same pressure. If pressure is uneven, adjust the perpendicularity precision (see Section 5.5, "Adjusting the Perpendicularity Precision").

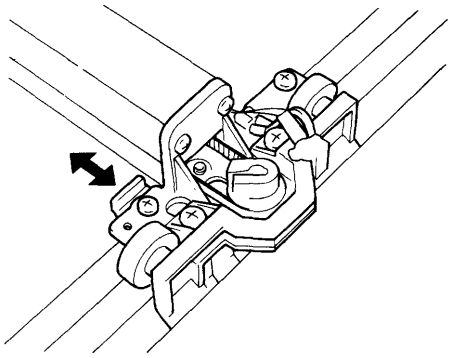


Fig. 5-11

(4) Attach the Y motor cover and rear cover B.

5.7 Adjusting the Pen Holder and Pivot Screws

After the pen holder and pivot screws are adjusted, the Y belt tension must be adjusted.

(1) Remove the solenoid cover.

(2) Remove the Y bar cover and Y pulley bracket, then remove the Y slider assembly from the Y bar by sliding it in the -Y direction.

(3) As shown in Fig. 5-13, turn the pivots to adjust both gaps between the pen holder and Y slider to the same distance (about 2 mm).

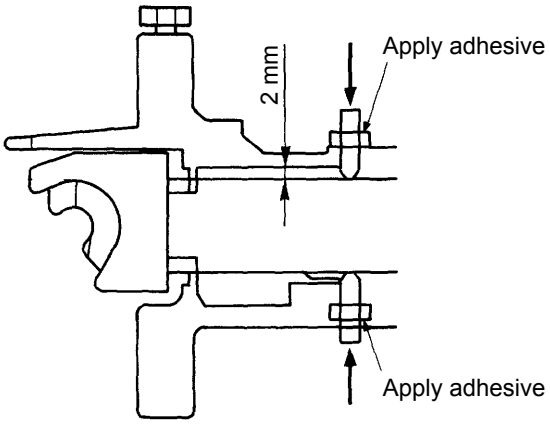


Fig. 5-12

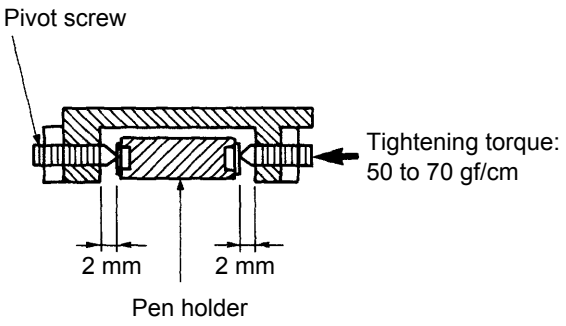


Fig. 5-13

(4) Check that there is no play in the pen holder.

(5) Remove the pen UP spring, manually raise the pen holder, then check that the pen holder lowers smoothly when released (see Fig. 5-14).

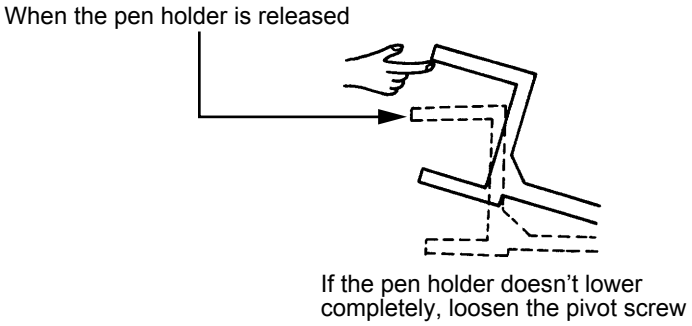


Fig. 5-14

(6) Tighten the nut of each pivot screw, then secure the screws with adhesive.

(7) Slide the Y slider assembly onto the Y bar and attach it.

(8) Attach the solenoid cover and Y pulley bracket.

(9) Adjust the Y belt tension (see Section 5.2, "Adjusting the Y Belt Tension").

(10) Attach the Y bar cover.

5.8 Adjusting the Pen Holder Height

(1) Attach a pen to the pen holder and raise the pen.

(2) Use the M3 x 4 mm hexagonal adjustment screw to adjust distance A between the raised pen's tip and writing panel surface to 1.8 mm minimum (2.6 mm maximum).
Be sure to measure the minimum and maximum distances throughout the entire writing panel's surface.

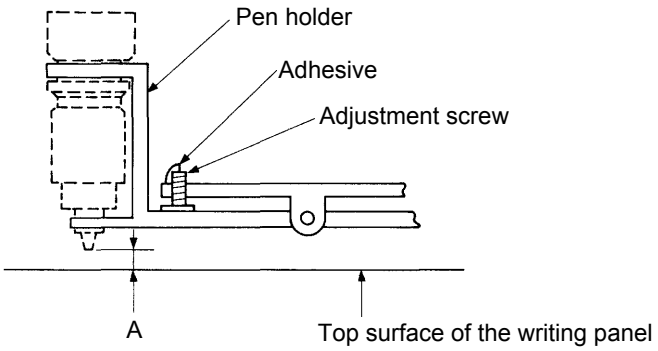


Fig. 5-15

(3) When adjustment is completed, apply adhesive to the adjustment screw.

5.9 Adjusting the Pen UP Spring

After the pen UP spring is adjusted, the pen force must be adjusted.

(1) Remove the solenoid cover.

(2) Attach a pencil plunger to the pen holder.

(3) Lower the pencil plunger slightly (0.5 to 1.0 mm) below the pen UP position, and temporarily loosen the pen force adjustment screw at that position.

(4) Gradually tighten the pen force adjustment screw until the pencil plunger reaches the pen UP position, then apply adhesive to the pen force adjustment screw as shown in Fig. 5-16.

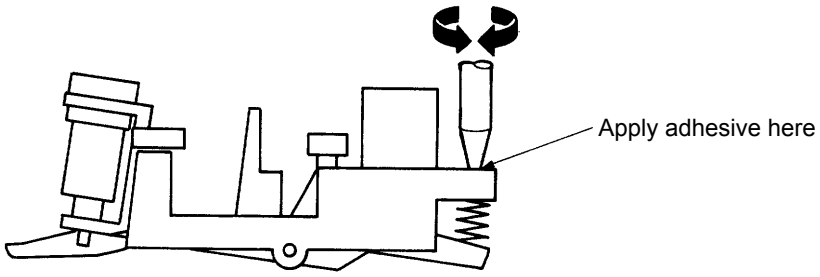


Fig. 5-16

(5) Attach the solenoid cover.

(6) Adjust the pen force (see Section 6.6, “Adjusting the Pen Force”).

5.10 Adjusting the X Home Position

(1) Remove the top left cover.

(2) Loosen the two M3 x 6 mm binding head screws (with plain washer).

(3) Adjust the X home position by sliding the X limiter bracket in the directions shown in Fig. 5-17.

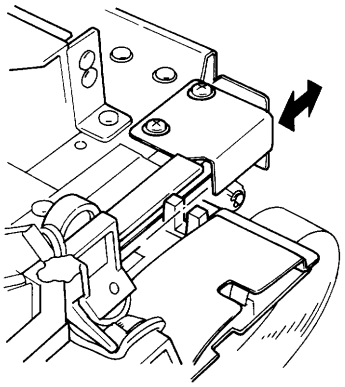


Fig. 5-17

(4) Attach the top left cover.

5.11 Adjusting the Y Home Position

(1) Adjust the Y home position by turning the M3 x 6 mm hexagonal bolt as shown in Fig. 5-18, then apply adhesive to that bolt.

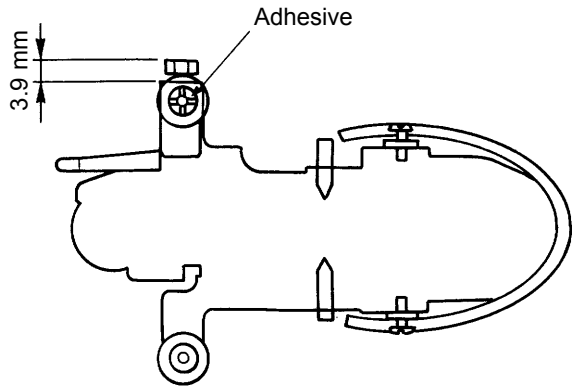


Fig. 5-18

5.12 Adjusting Pen Retrieval

Before attempting to adjust pen retrieval, check the perpendicularity precision (see Section 5.4, “Checking the Perpendicularity Precision”) and adjust it if necessary (see Section 5.5, “Adjusting the Perpendicularity Precision”).

(1) Remove the top left cover.

(2) If the Y bar is not parallel to the pen station, move the Y bar so that it is parallel.

(3) Set the plotter to pen retrieval test mode by holding down the LEFT ARROW (-X) and DOWN ARROW (-Y) POSITION keys while turning on the plotter.

(4) Adjust the X and Y home positions (see Sections 5.10, “Adjusting the X Home Position,” and 5.11, “Adjusting the Y Home Position”) to positions where the pen retrieval test can be enabled.

(5) Mount disposable ink pens in Positions 1 to 8 of the pen station.

(6) Press the ENTER key to start the pen retrieval test and check the following points:

- The ink pen plunger does not contact the pen holder.
- The pen tip does not touch the pen cap (see Fig. 5-19). If the pen tip touches the pen cap, loosen the two M3 x 12 mm tapping screws, raise the pen station and then tighten the two screws. If raising the pen station does not solve the problem, add a plain washer of 3 mm diameter and 0.5 mm thickness beneath the pen station mounting bracket (see Fig. 5-20).

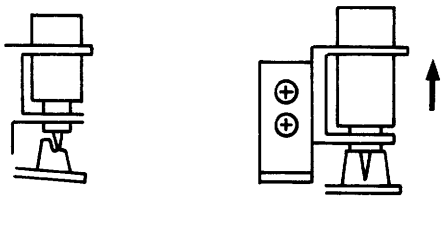


Fig. 5-19

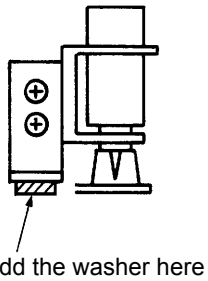


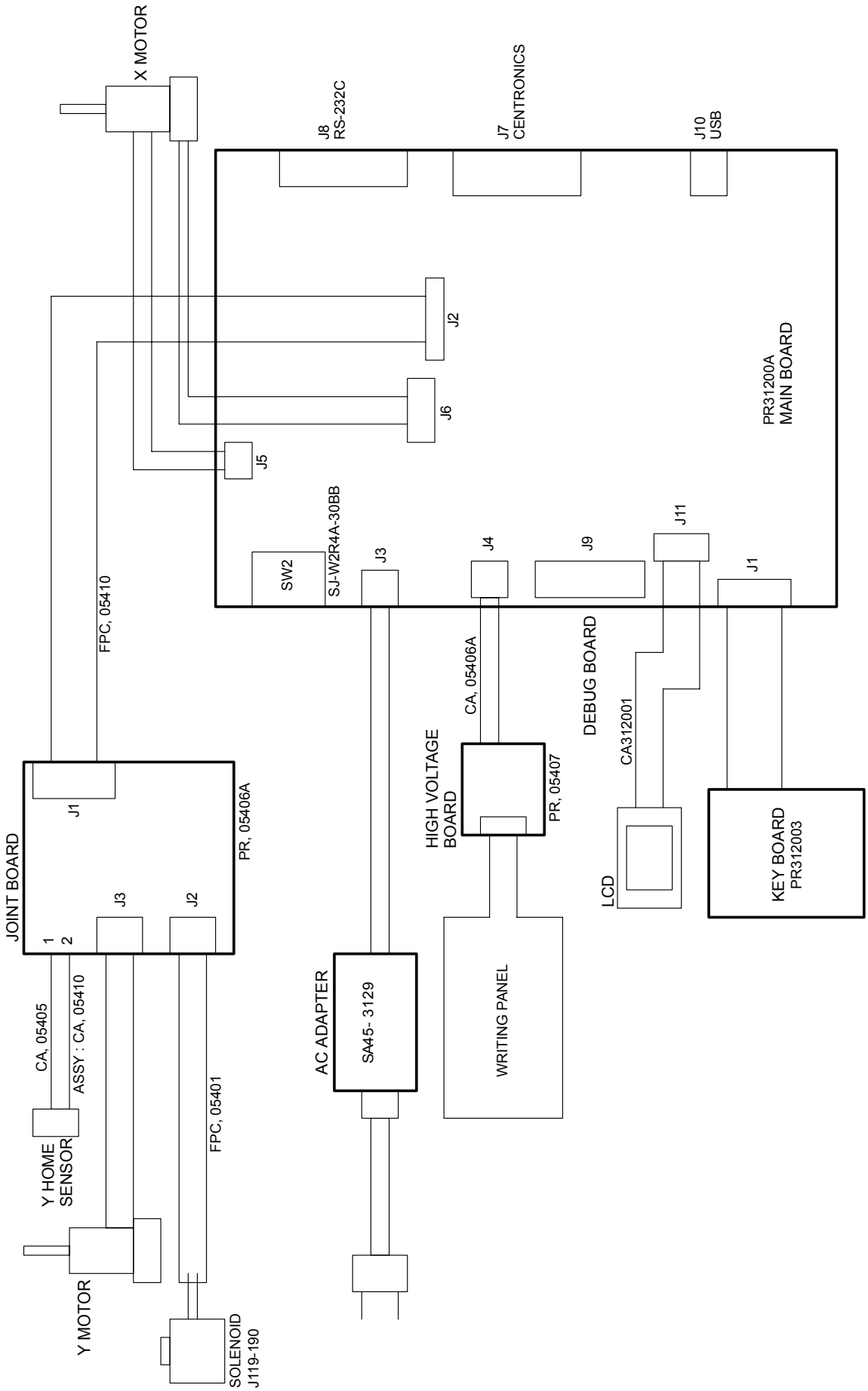
Fig. 5-20

Note: Execution of the pen retrieval test can be temporarily suspended by pressing the PAUSE or ENTER key. To resume test execution, press the PAUSE or ENTER key

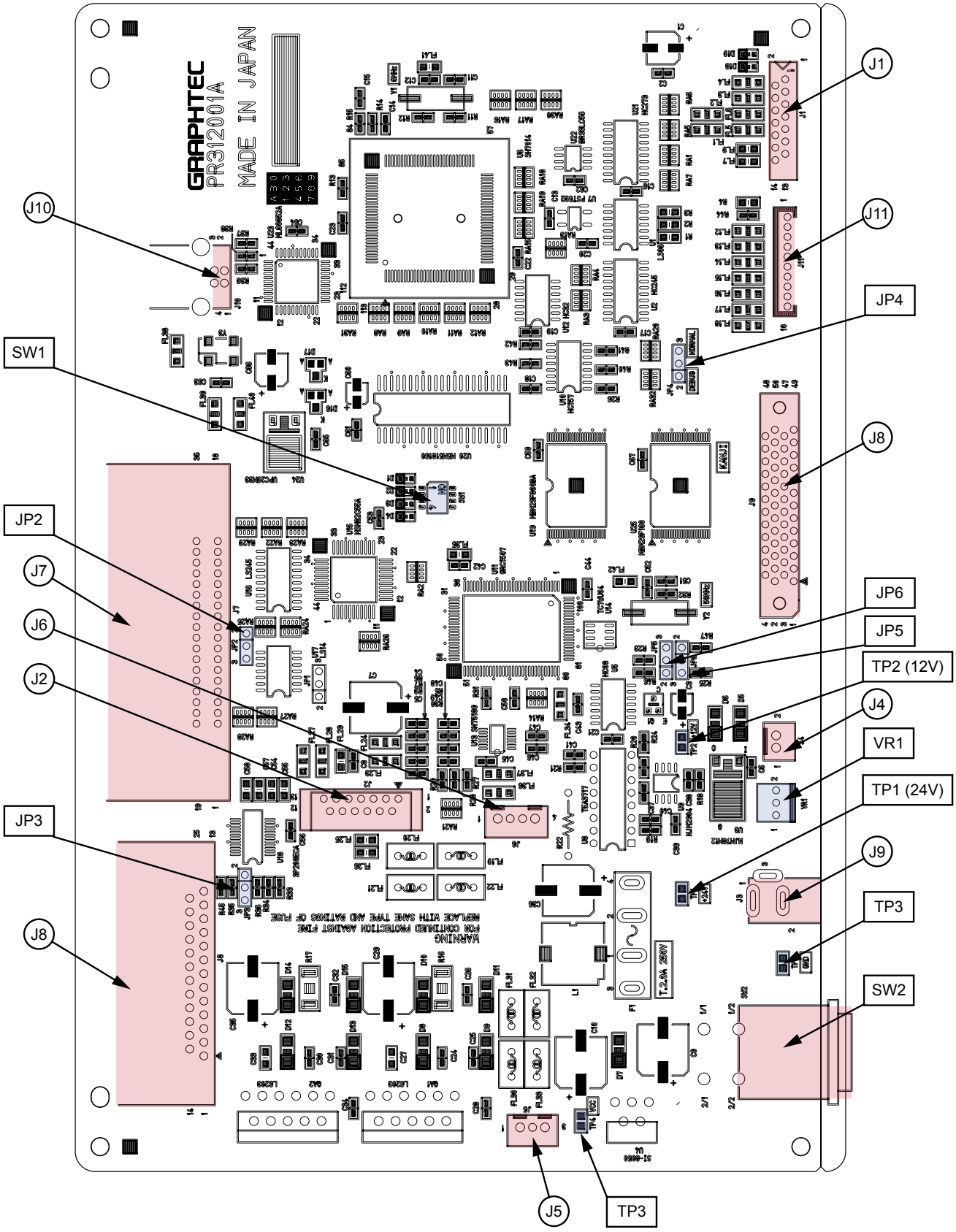
(7) Attach the top left cover.

6. ELECTRICAL ADJUSTMENTS

6.1 Wiring Diagrams



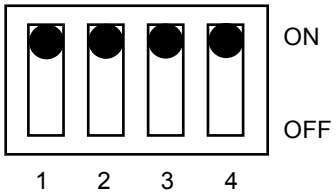
6.1.1 Component Layout on the Main Board



6.2 DIP Switch Settings

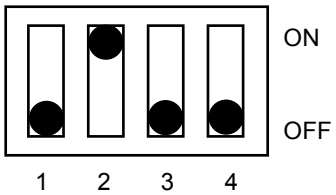
Factory presets (Normal Mode)

SW1



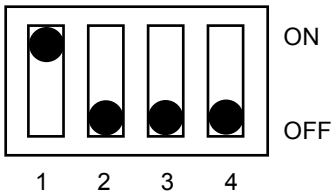
NOV-RAM Clear mode

SW1



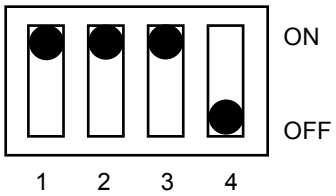
Sensor test mode

SW1



Control panel key test mode

SW1



6.3 Checking the Voltage Level for the Main Board

(1) Remove the bottom panel assembly and top left cover.

(2) Connect all cables to the main board as shown in Fig. 6-1 below except for connector J4 that connects to the electrostatic adhesion circuit board.

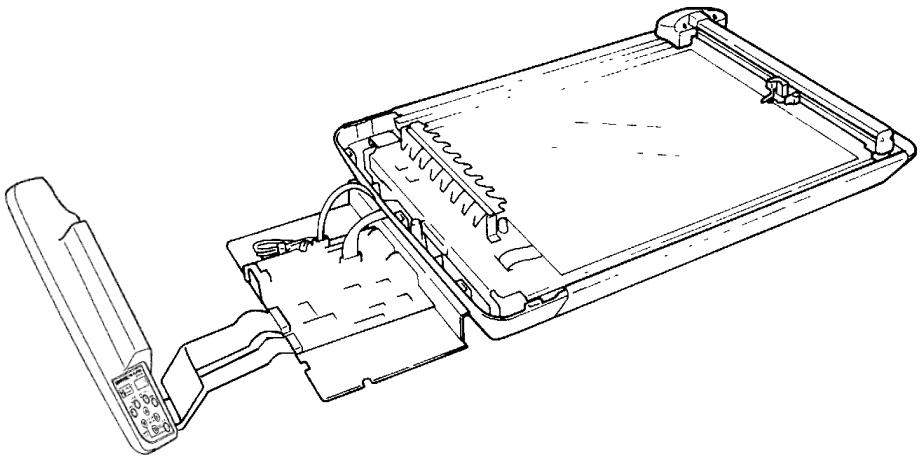


Fig. 6-1

(3) Connect the AC adapter to the main board.

(4) Turn on the power switch and then check the voltage levels.

(5) You will find test pins (TP1 through TP4) on the main board. The output voltage levels of these pins are given in the table below.

Test pin		Output voltage	Permissible range
No.	Name		
TP1	+24V	+24V	+22.5V to +25.5V
TP2	+12V	+12V	+11.5V to 12.5V
TP3	GND	0V	
TP4	VCC	+5V	+4.9V to +5.1V

6.4 Updating the System Firmware

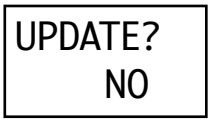
To update the system firmware you need to have the following files. In addition, you need to use a computer and Centronics cable.

- MP303.X : MP303-04 firmware
- SEND.EXE : Utility to transfer files using Windows
- SENDB.EXE : Utility to transfer files using DOS

How to update the system firmware

(1) Connect the computer and the MP303-04 via the Centronics interface.

(2) Turn on the power while pressing the RIGHT ARROW POSITION key and the LEFT ARROW POSITION key, and then press the ENTER key to display the menu shown below.



(3) Select “YES” using the UP ARROW POSITION key or the DOWN ARROW POSITION key to display the menu shown below.

This enables you to select the timing of the Centronics interface.
Normally, there is no need to change this setting. If you cannot transfer data correctly via the Centronics interface, use the UP ARROW POSITION key or the DOWN ARROW POSITION key to change this timing.

(4) Press the ENTER key to display the menu shown below.

(5) Send firmware to the plotter from the computer.
Drag and drop the firmware file onto the SEND.EXE icon when using Windows. For DOS mode, use SENDB.EXE as shown below.
>SENDB MP303.X

(6) The following menu is displayed while data is being received.

(7) The plotter will start the initialization routine when all the data has been received. The firmware versions are displayed during the initialization routine. Check the firmware version that you updated.

(8) Turn off the power.

(9) Perform the NOV-RAM clear operation whenever you replace the main board.

6.5 NOV-RAM Clear

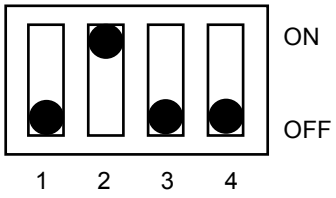
When you replace the main board, you must clear the Non-Volatile RAM (NOV-RAM).

If you clear the Non-Volatile RAM, you will lose the setup parameters.

How to clear the Non-Volatile RAM

(1) Set SW1 to the NOV-RAM Clear mode as shown below.

SW1



(2) Turn on the power to the plotter.

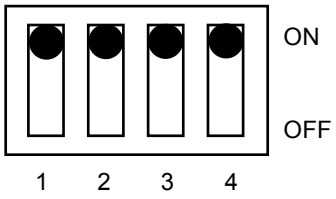
(3) The NV RAM CLEAR menu appears. The plotter immediately starts to clear the parameters on the NOV-RAM, and then sets the default values.

(4) When Non-Volatile RAM clearing is complete, the NV RAM OK! menu appears.

(5) Turn off the power to the plotter.

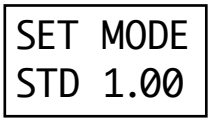
(6) Return the SW1 setting to normal mode as shown below.

SW1



(7) Turn on the power to the plotter.

The SET MODE menu appears. (This menu appears when you clear the Non-Volatile RAM)



(8) Select “STD” for the standard model using the LEFT ARROW POSITION key or RIGHT ARROW POSITION key.

(9) Press the ENTER key to store the setting.

(10) Turn off the power to the plotter.

6.6 Adjusting the Pen Force

Place the plotter on a horizontal surface such as a table.

(1) Mount a ceramic pen in position No.1 of the pen station and then load a sheet of paper.

(2) Press the PAUSE key to retrieve the ceramic pen, then lower the pen by following the displayed menu.

(3) Press the MODE key, and then press the UP ARROW POSITION key or DOWN ARROW POSITION key until the menu shown below appears.

```
PEN TYPE
Ceramic
```

(4) Select “PEN TYPE Ceramic” by pressing the LEFT ARROW POSITION key or RIGHT ARROW POSITION key. This selection enables you to measure the pen force using the low pen force mode.

(5) Raise the pen using a 50 g dial tension gauge, then measure the pen force at the point when the pen tip separates from the paper.

Press the UP ARROW POSITION key or DOWN ARROW POSITION key until the menu shown below appears.

```
 Pen
Up  Down
```

Press the LEFT ARROW POSITION key or RIGHT ARROW POSITION key to raise or lower the pen.

(6) Adjust the pen force using VR1 so that it is within the range of 20 to 33 g in the low pen force mode. There is a hole for maintenance use on the lower left of the cover. You can turn VR1 from this hole.

(7) Raise and lower the pen two or three times to get the correct pen force.

(8) Press the MODE key, and then press the UP ARROW POSITION key or DOWN ARROW POSITION key until the menu shown below appears.

```
PEN TYPE
W.Fiber
```

(9) Select “PEN TYPE W.Fiber” by pressing the LEFT ARROW POSITION key or RIGHT ARROW POSITION key. This selection enables you to measure the pen force using the high pen force mode.

(10) Raise the pen using a 50 g dial tension gauge, then measure the pen force at the point when the pen tip separates from the paper.

Press the UP ARROW POSITION key or DOWN ARROW POSITION key until the menu shown below appears.

```
 Pen
Up  Down
```

Press the LEFT ARROW POSITION key or RIGHT ARROW POSITION key to raise or lower the pen.

(11) Adjust the pen force using VR1 so that it is within the range of 35 g to 50 g in the high pen force mode.

(12) Raise and lower the pen two or three times to get the correct pen force.

Pen Force

	Target Pen Force	Pen Type
Low Pen Force	25 g (20 to 33 g)	Ceramic
High Pen Force	40 g (35 to 50 g)	W.Fiber

6.7 Using the Test Modes

6.7.1 Self Test

Your plotter comes with a self-test mode, which enables the plotter to check its own functions, without necessarily being connected to the computer.

A correctly drawn test pattern signifies that all of the functions of the plotter (excluding the interface functions) have been tested and found normal. Be sure to run this self-test before connecting the plotter to the computer.

Procedure

(1) Check that the POWER switch is off and that pens are mounted in the pen station.

(2) Turn on the POWER switch while holding down the LEFT ARROW POSITION key.

The plotter is initialized.

The prompts below are consecutively displayed.

```
SelfTest
  Mode
```

```
   Set
 Paper!
```

(3) After initialization has been completed, place a sheet of paper on the writing panel.

Press the CHART HOLD key to secure the sheet. The prompt below is displayed.

```
 Press
Ent key
```

(4) Press the ENTER key to draw the self-test pattern.

The plotter repeatedly plots the same pattern until you cancel the self-test mode.

To temporarily stop plotting, press the PAUSE key.

To cancel the self-test mode, press the CANCEL key to stop plotting and then turn off the plotter.

6.7.2 Character Dump Mode

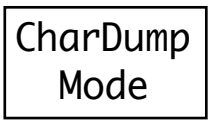
This mode allows experienced users to detect the cause of communication problems between the plotter and the computer. In Character Dump mode, the plotter produces an exact printout of the codes it receives, printing character data as ASCII codes and the non-character (control) data as two-digit hexadecimal values (e.g., 0A: Line Feed, 0D: Carriage Return).

Procedure

(1) Mount a pen in the pen station's Pen 1 position.

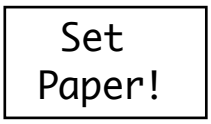
(2) Place a sheet of paper on the writing panel.

(3) Hold down the DOWN ARROW POSITION key while you turn on the plotter.
The plotter is initialized.



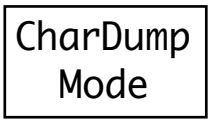
(4) Secure the paper.

The prompt below is displayed to prompt you to press the CHART HOLD key.



(5) Once the paper is secured, the PROMPT lamp on the plotter blinks.
The prompt below is displayed.

(6) Press the ENTER key to enter the Character Dump Mode.
The plotter prints "** DUMP MODE (V*.** GL) **" on the paper and then awaits data from the computer.
The message below briefly reappears on the display.



(7) When the computer runs an application program and outputs the data to the plotter, it starts printing the received data in ASCII format.

(8) To exit the Character Dump Mode, turn off the plotter and then turn it back on using only the POWER switch.

6.7.3 Debug Mode

This mode is used to locate programming errors in your application program.

When the plotter is in Debug Mode, its buffer size is reduced to permit easier detection of the section of the program that is causing the plotting error.

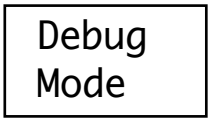
Procedure

(1) Mount a pen in the pen station's Pen 1 position.

(2) Place a sheet of paper on the writing panel.

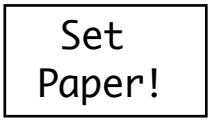
(3) Hold down the ENTER key while you turn on the plotter.

The plotter is initialized.

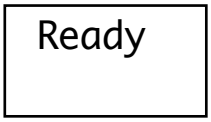


(4) Secure the paper.

The prompt below is displayed for a few seconds to prompt you to press the CHART HOLD key.



The prompt below is displayed



(5) The plotter is now in the Debug Mode.

(6) Run the target program at the computer for output to the plotter.

The message DEBUG MODE is displayed for a few seconds.

In this mode, the plotter's buffer memory is reduced to the following sizes:

- In RS-232C mode : 256 bytes
- In Centronics mode : 10 bytes

(7) To exit the Debug Mode, turn off the plotter and then turn it back on using only the POWER switch.

HINT: When using the RS-232C interface, the timing of data transmission varies with the selected handshake mode as follows.

• During hardwire handshaking:

The ER (DTR) signal line goes off when the available space in the buffer drops to 64 bytes.

It goes on when the available space in the buffer rises to 128 bytes of data.

• During Xon/Xoff handshaking:

Xoff status is entered when the available space in the buffer drops to 32 bytes.

Xon status is entered when the available space in the buffer rises to 128 bytes of data.

NOTE: **After the plotter is turned off, Debug mode is not resumed when only the ENTER key is pressed.**

The Debug mode cannot be used with the USB interface.

6.7.4 Pen Retrieval Test Mode

Use this mode to perform a pen retrieval test and to adjust the pen positions.

Procedure (Fast Mode)

(1) Mount disposable ink pens in Positions 1 to 8 of the pen station.

(2) Hold down the LEFT ARROW POSITION key and DOWN ARROW POSITION key while you turn on the plotter.

(3) Press the ENTER key to start the pen retrieval test.
Execution of the pen retrieval test can be temporarily suspended by pressing the PAUSE or ENTER key. To resume test execution, press the PAUSE or ENTER key.

(4) To exit the pen retrieval test mode, turn off the plotter.

Procedure (Slow Mode and Pen Position Adjustment)

(1) Mount disposable ink pens in Positions 1 to 8 of the pen station.

(2) Hold down the CANCEL key while you turn on the plotter.

(3) Place a sheet of paper on the writing panel.

(4) Press the ENTER key to display the prompt shown below.

```
Select
ADJ SLOW
```

(5) If you want to start the slow pen retrieval test, press the RIGHT ARROW POSITION key. The plotter will begin plotting the pen numbers on the paper.
Execution of the pen retrieval test can be temporarily suspended by pressing the PAUSE or ENTER key. To resume test execution, press the PAUSE or ENTER key.

(6) If you want to adjust the pen positions, press the LEFT ARROW POSITION key at the above menu. The plotter then displays the menu shown below. You can adjust the position of pen number 1 by using the ARROW POSITION keys.

```
No.1
PressENT
```

Press the ENTER key after you have adjusted the position of pen number 1. The plotter then displays the menu shown below.

```
No.8
PressENT
```

Press the ENTER key after you have adjusted the position of pen number 8.

(7) To exit the pen retrieval test mode, turn off the plotter.

6.7.5 Running Test Mode

Procedure

(1) Move the pen carriage manually to the upper left position so that it crosses the X home sensor and Y home sensor.

(2) Hold down the CANCEL key and MODE key while you turn on the plotter.

(3) The plotter starts the running test.

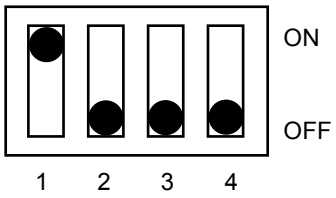
(4) To exit the Running Test Mode, turn off the plotter.

6.7.6 Sensor Test Mode

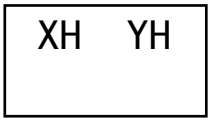
Procedure (Using the DIP switch)

(1) Set SW1 to the Sensor Test Mode as shown below and then turn on the plotter.

SW1



(2) The status of each sensor is displayed on the LCD panel.

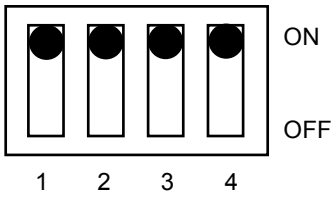


Display	Sensor name	Operation when the High/Low level changes	
XH	X home sensor	When the dog blocks the sensor	XL
YH	Y home sensor	Same as the above	YL

(3) If a sensor is not operating properly, check its wiring, its connector contact, and the position of the sensor dog. If everything checks out all right, either the sensor or main board may be defective.
In this case, initialize the NOV-RAM and then run the sensor test again.

(4) To exit the sensor test mode, turn off the plotter and then return the SW1 setting to normal mode as shown below.

SW1



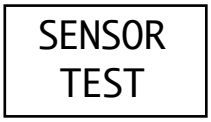
Procedure (Using control panel keys)

(1) Move the pen carriage manually to the upper left position so that it crosses the X home sensor and the Y home sensor.

(2) Hold down the UP ARROW POSITION key and DOWN ARROW POSITION key while you turn on the plotter.

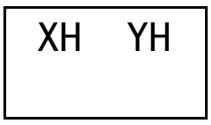
(3) The menu below appears.

(4) Press the DOWN ARROW POSITION key to display the menu shown below.



(5) Press the ENTER key to put the plotter into the Sensor Test Mode.

(6) The status of each sensor is displayed on the LCD panel.



Display	Sensor name	Operation when the High/Low level changes	
XH	X home sensor	When the dog blocks the sensor	XL
YH	Y home sensor	Same as the above	YL

(7) If a sensor is not operating properly, check its wiring, its connector contact, and the position of the sensor dog. If everything checks out all right, either the sensor or main board may be defective.
In this case, initialize the NOV-RAM and then run the sensor test again.

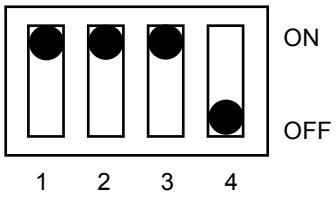
(8) To exit the Sensor Test Mode, turn off the plotter.

6.7.7 Control Panel Key Test Mode

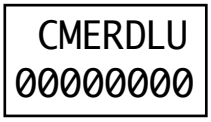
Procedure (Using the DIP switch)

(1) Set SW1 to the Control Panel Key Test Mode as shown below and then turn on the plotter.

SW1



(2) The menu below appears, so press the control panel key corresponding to each bit and check that its value properly changes to 1 from 0.



Press each key on the control panel; the status will change as shown below.

Key	Status of LCD							
		C	M	E	R	D	L	U
CANCEL	0	1	0	0	0	0	0	0
MODE	0	0	1	0	0	0	0	0
ENTER	0	0	0	1	0	0	0	0
RIGHT ARROW	0	0	0	0	1	0	0	0
DOWN ARROW	0	0	0	0	0	1	0	0
LEFT ARROW	0	0	0	0	0	0	1	0
UP ARROW	0	0	0	0	0	0	0	1

Normal status : 0

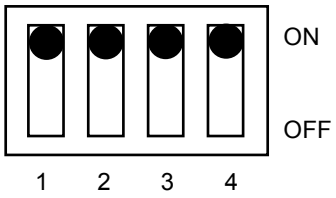
While the key is pressed : 1

(3) If a key is not operating properly, check its wiring and its connector contact. If everything checks out all right, either the control panel or main board may be defective.

In this case, initialize the NOV-RAM and then run the control panel key test again.

(4) To exit the Control Panel Key Test Mode, turn off the plotter and then return the SW1 setting to normal mode as shown below.

SW1



Procedure (Using control panel keys)

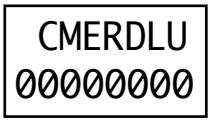
(1) Move the pen carriage manually to the upper left position so that it crosses the X home sensor and the Y home sensor.

(2) Hold down the UP ARROW POSITION key and the DOWN ARROW POSITION key while you turn on the plotter.

(3) The menu below appears.

(4) Press the ENTER key to put the plotter into the Control Panel Key Test Mode.

(5) The menu below appears, so press the control panel key corresponding to each bit and check that its value properly changes to 1 from 0.



Press each key on the control panel; the status will change as shown below.

Key	Status of LCD							
		C	M	E	R	D	L	U
CANCEL	0	1	0	0	0	0	0	0
MODE	0	0	1	0	0	0	0	0
ENTER	0	0	0	1	0	0	0	0
RIGHT ARROW	0	0	0	0	1	0	0	0
DOWN ARROW	0	0	0	0	0	1	0	0
LEFT ARROW	0	0	0	0	0	0	1	0
UP ARROW	0	0	0	0	0	0	0	1

Normal status : 0

While the key is pressed : 1

(6) If a key is not operating properly, check its wiring and its connector contact. If everything checks out all right, either the control panel or main board may be defective.

In this case, initialize the NOV-RAM and then run the control panel key test again.

(7) To exit the Control Panel Key Test Mode, turn off the plotter.

7. TROUBLESHOOTING

7.1 The Plotter is Turned On But Doesn't Operate

Symptom		Cause	Solution
POSITION XY ALARM error appears.	Right after the plotter is turned on.	The X or Y motor is defective.	Replace the X or Y motor.
		The main board is defective.	Replace the main board.
	During pen retrieval.	See "The plotter cannot perform pen retrieval correctly." shown below.	See "The plotter cannot perform pen retrieval correctly." shown below.
	During a plotting operation.	There is something blocking the X slider or Y slider.	Remove the blocking object.
		The motor control is abnormal.	Replace the main board.
	During initialization.	Incorrect X or Y home sensor position.	Adjust the X or Y home sensor position. (See Sections 5.10, 5.11.)
		The X or Y home sensor is defective.	Replace the X or Y home sensor.
The plotter is not initialized.	The POWER LED lamp does not light.	The AC adapter is defective.	Replace the AC adapter.
		The main board is defective.	Replace the main board.
	The POWER LED lamp lights.	The firmware is defective.	Download new firmware.
		The main board is defective.	Replace the main board.

7.2 During Plotting Operations

Symptom		Cause	Solution
The plotted lines are faint or blurred.	Non-specified paper was used.	The paper does not suit the pens being used.	Use the specified paper.
	Specified paper was used.	The pen speed is too fast or the pen force is too low.	Reduce the pen speed or increase the pen force.
		Defective pen(s).	Replace the pen(s).
		The pen solenoid is defective.	Replace the pen solenoid.
The pen doesn't lower.		The pen solenoid is defective.	Replace the pen solenoid.
		The Y flexible cable is defective.	Replace the Y flexible cable.
		The main board is defective.	Replace the main board.
The plotted line quality is poor.	Appears in the X-axis. Plotted lines are crooked.	The X belt tension is incorrect. The X roller pressure is incorrect.	Adjust the X belt tension. (See Section 5.1.) Adjust the X roller pressure. (See Section 5.6.)
	Appears in the Y-axis. Plotted lines are crooked.	The Y belt tension is incorrect. The Y roller pressure is incorrect.	Adjust the Y belt tension. (See Section 5.2.) Adjust the Y roller pressure.
The plotter cannot perform pen retrieval correctly.	The plotter doesn't draw lines at right angles.	The perpendicularity is incorrect.	Adjust the perpendicularity precision.
	The retrieval position shifts to the X direction.	The X home position has shifted.	Adjust the X home position. (See Section 5.10.)
	The retrieval position shifts to the Y direction.	The Y home position has shifted.	Adjust the Y home position. (See Section 5.11.)
	The perpendicularity and X/Y home positions are correct.	The pen station position is incorrect.	Adjust the pen station position. (See Section 5.12.)

8. ERROR MESSAGES

8.1 Hardware Error

Displayed message	Cause
POSITION XY ALARM	This message appears when, for some reason, the current pen position is invalid. In this case, turn the plotter off and then back on again.

8.2 GP-GL Command Errors

In GP-GL command mode, the plotter displays the error messages below if an error occurs for which masking of the corresponding Error bit in the STATUS byte has been disabled using the ˝ command.

Displayed message	Cause
E1. COMM ERR	A command error occurs if a hexadecimal code from 60H to 7EH is processed as a command character. This message may also appear if the RS-232C interface conditions are improperly set or if the program being run at the computer was not written using GP-GL commands.
E4. PARA OV	When a command specifying coordinate values is being processed, a parameter overflow error occurs if a numeric parameter exceeds the “Parameter Range”.
E5. I/O ERR	An input/output error occurs during the transfer of data via the interface. With the RS-232C interface, this message indicates that the parity or data length may be improperly set. Check your interface conditions once more.

Cancelling an error status

You can cancel an error status using any of the methods below, thereby setting the status of the corresponding Error bit to zero.

(1) Execute a READ STATUS WORD 1 or READ STATUS WORD 3 command.

(2) Press the ENTER key. (Effective only in case of a data format error.)

Note: If a data format error has occurred, performing either Method (1) or (2) above while execution of the next command is temporarily suspended enables that command to be executed.

(3) Initialize the plotter.

(4) Execute the INTERFACE CLEAR command.

Note: Method (3) or (4) clears all the data in the plotter’s buffer memory.

8.3 HP-GL Command Errors

The plotter displays the messages below when an error occurs for which masking of the corresponding Error bit in the STATUS byte has been disabled using the IM command.

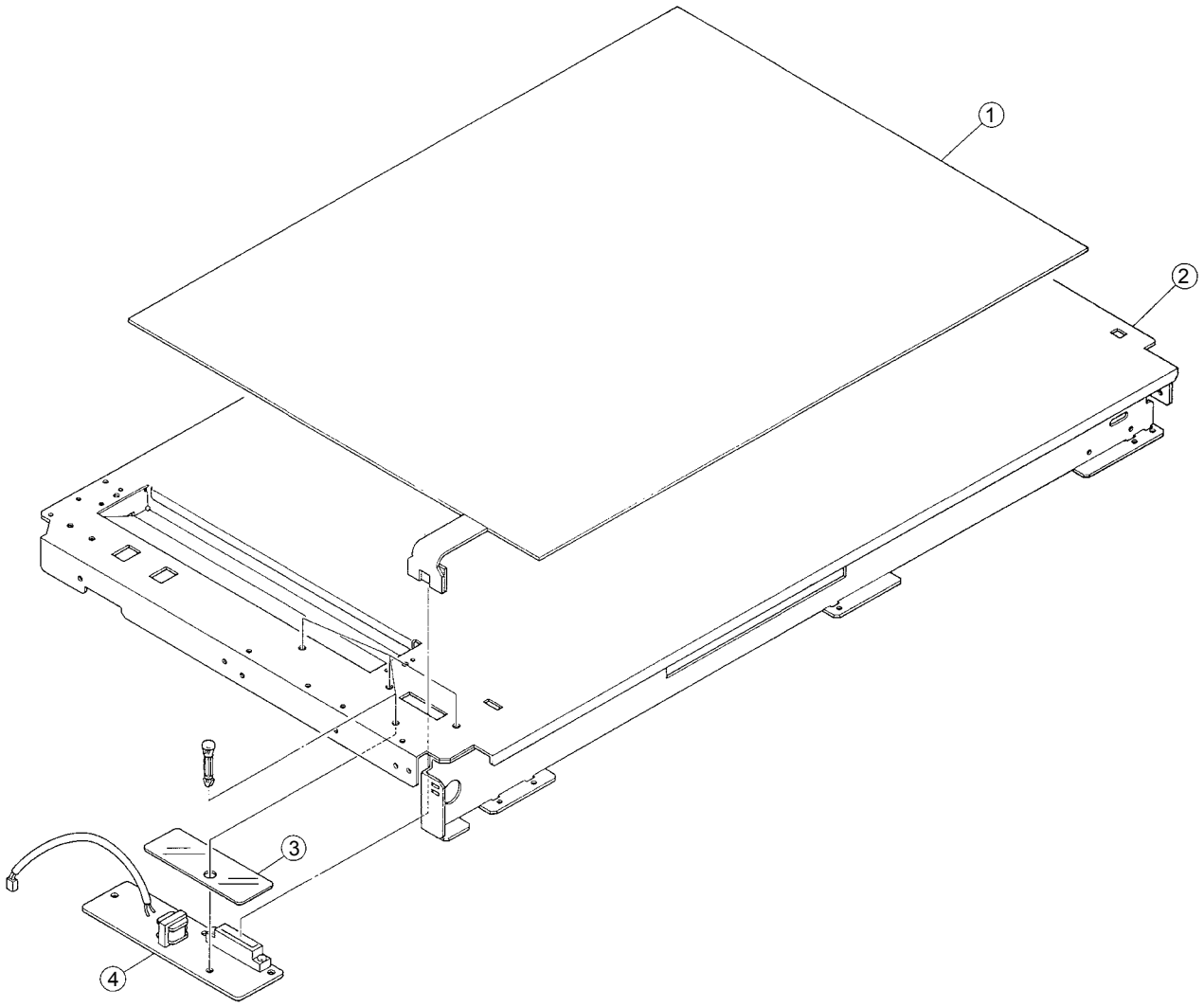
Displayed message	Cause
E1. COMM ERR	A command that cannot be recognized was executed. Check that your program contains valid HP-GL commands.
E2. PARA NO. ERR	A command containing an incorrect number of parameters was executed. Check that the commands specified in your program are followed by the correct number of parameters.
E3. PARA EXCEEDED	A command containing a parameter value that exceeds its permissible range was executed. Check the permissible parameter range.
E5. PARA UNKNOWN	A character that your plotter cannot plot was specified.

9. DISASSEMBLY DIAGRAMS AND PARTS LISTS

9.1 Main Unit

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	035130123	Electrostatic Panel		1	Same as MP5300
2	618260100	Writing Panel Base		1	
3	035130110	Insulating Sheet		1	Same as MP5300
4	773513500	High Voltage Board		1	Same as MP5300

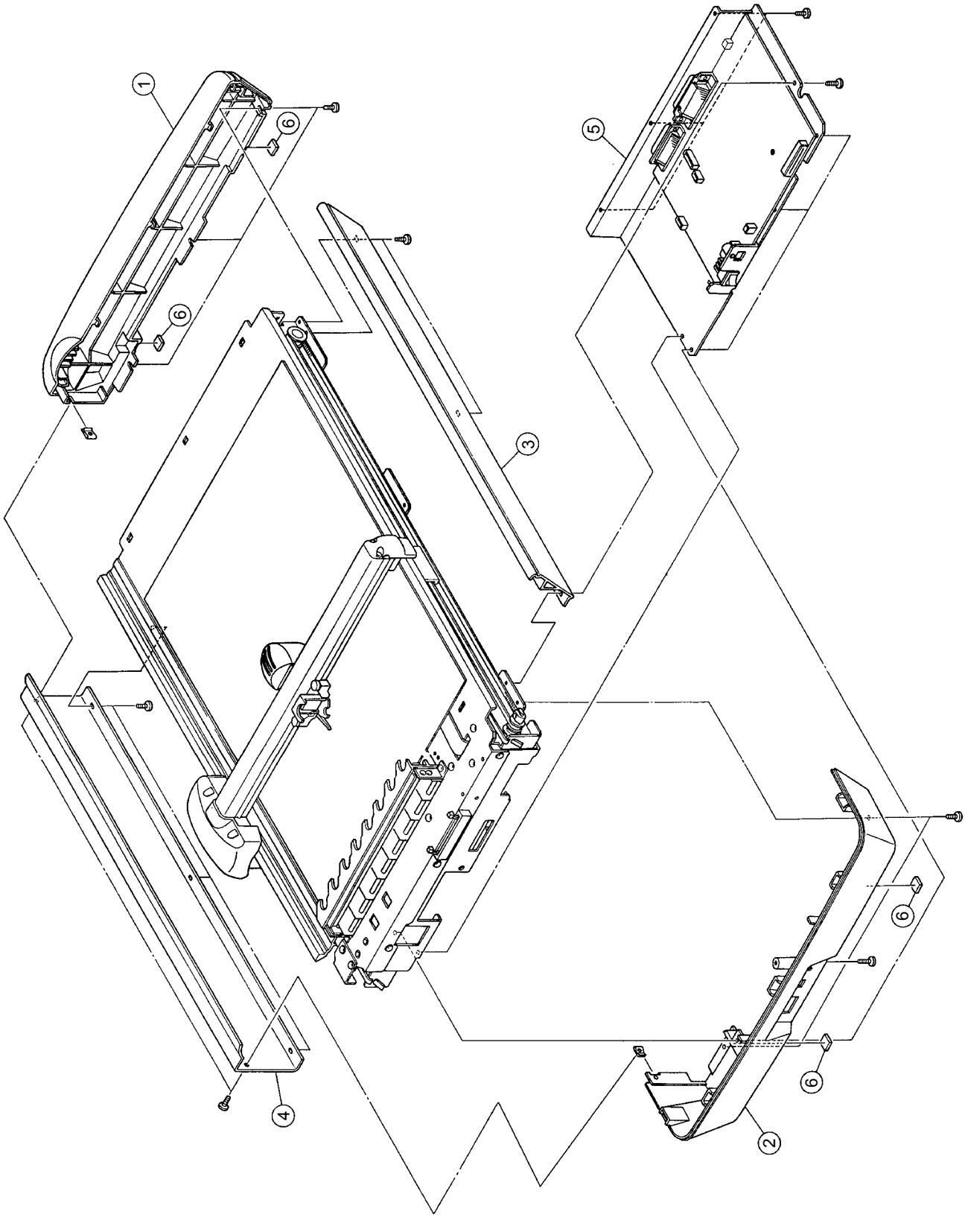
Main Unit



9.2 External Casing

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	618264150	Cover, Right		1	
2	035135023	Cover, Lower Left		1	
3	618264120	Cover, Front		1	
4	618264140	Cover, Rear		1	
5	618260200	Bottom Plate 303		1	
6	031000070	Rubber Foot		4	Same as MP5300

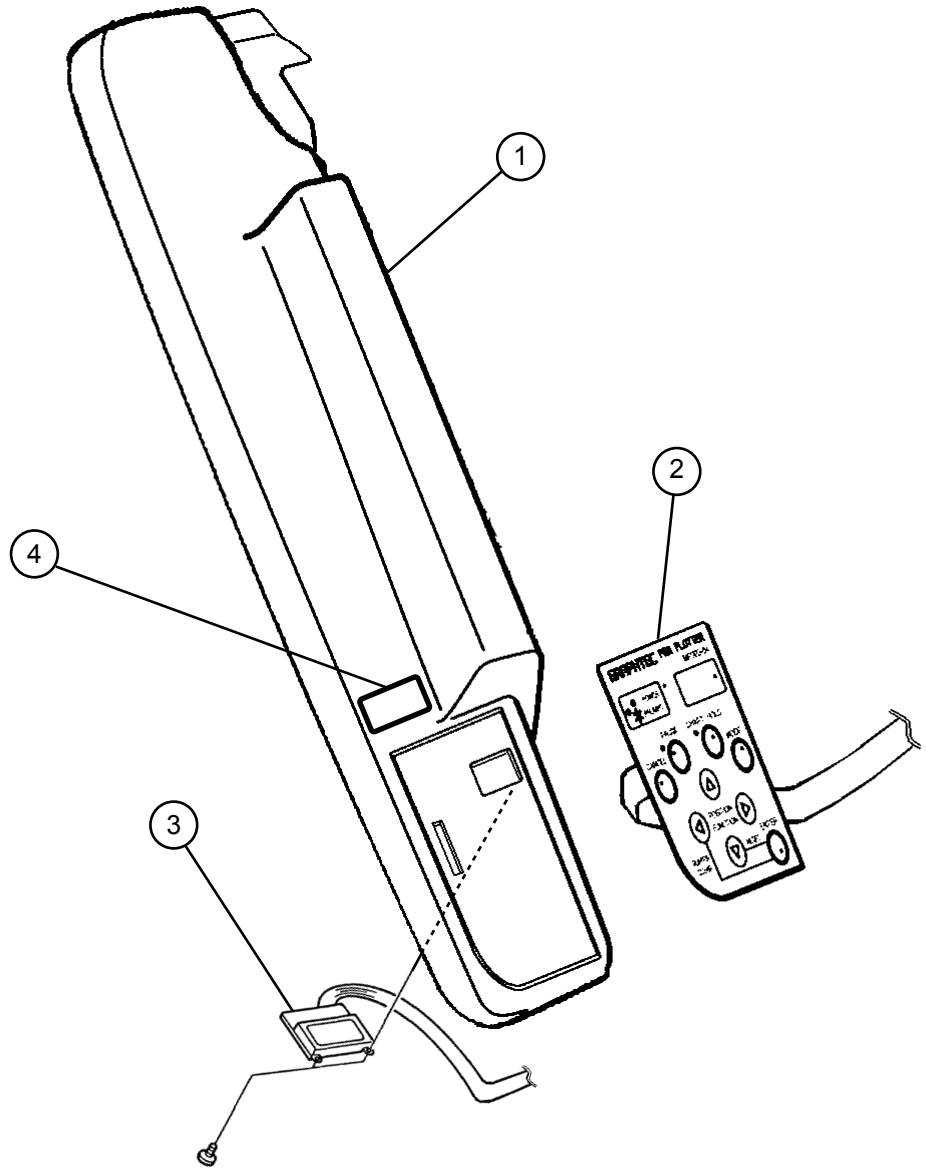
External Casing



9.3 Control Panel Section

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	618264100	Cover, Upper Left		1	
2	618260300	Control Panel	PR312003	1	
3	771826570	LCD Assembly	DMC50448N-E-AE, CA312001	1	
4	031000160	Caution Label No.2		1	Same as MP5300

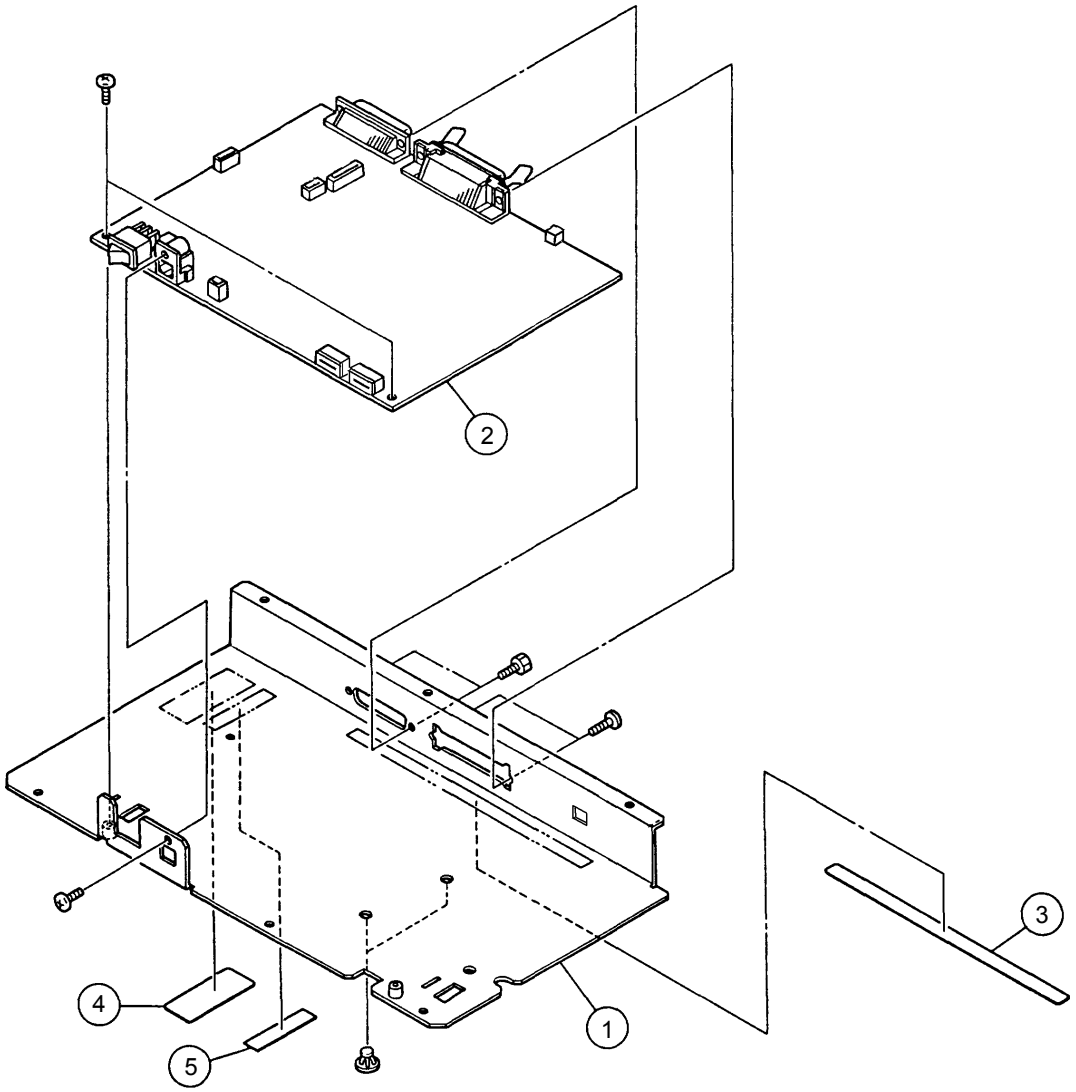
Control Panel Section



9.4 Bottom Panel

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	618260200	Bottom Plate 303		1	
2	771826500	Main Board 303		1	
3	618264210	Terminal Label 303		1	
4	618264200	Model Name Label 303		1	

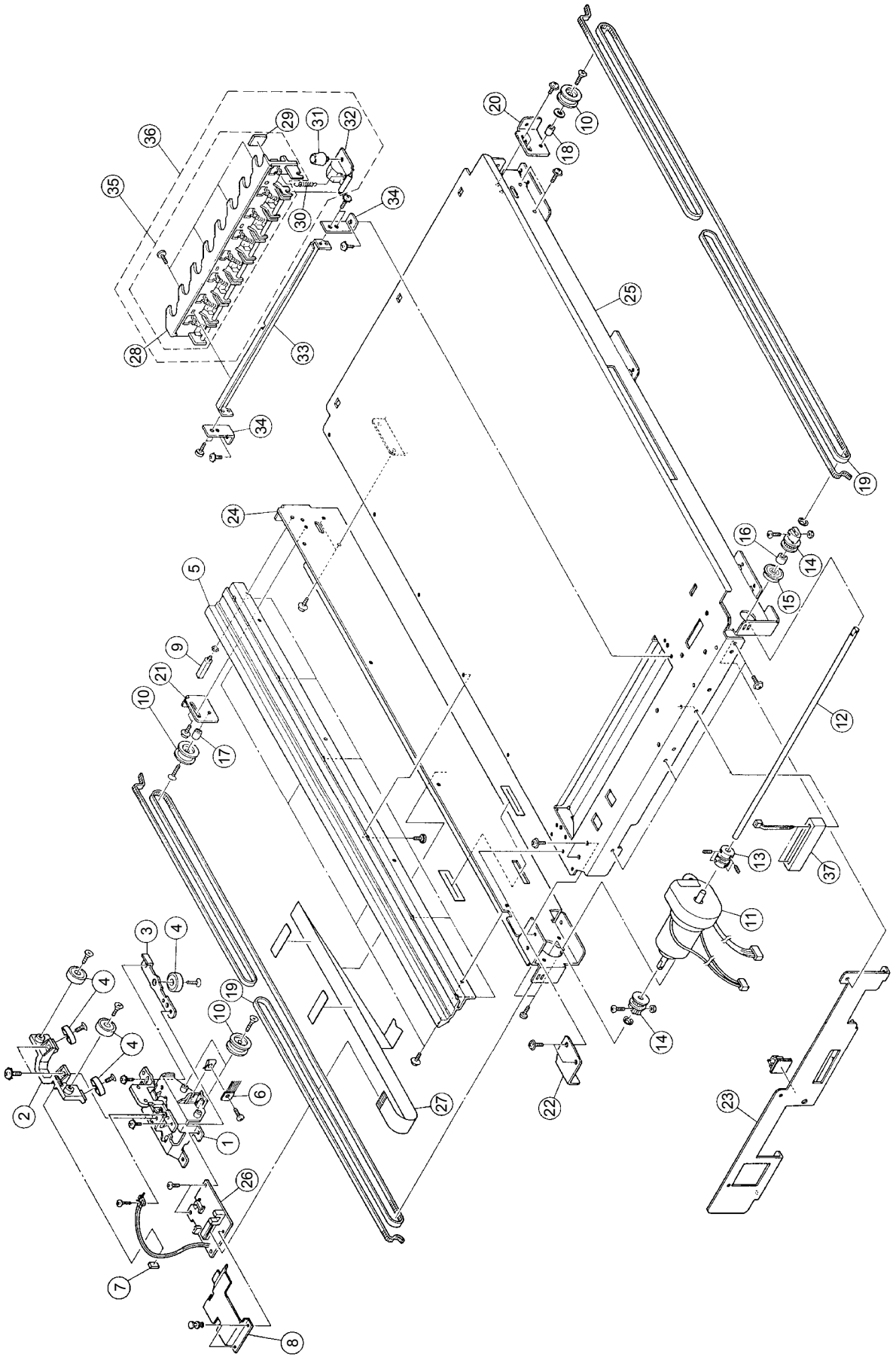
Bottom Panel



9.5 X-Axis Slider, X-Axis Drive, Pen Station

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	035132013	X Slider		1	Same as MP5300
2	035132022	X Roller Bracket		1	Same as MP5300
3	035132030	X Roller Adjustment Bracket		1	Same as MP5300
4	303100012	X Roller		5	Same as MP5300
5	035132040	X Rail		1	Same as MP5300
6	035132220	Antistatic Brush		1	Same as MP5300
7	035132230	Retaining Rubber		1	Same as MP5300
8	035132080	Blank Cover		1	Same as MP5300
9	302200015	Support	BSB320	1	Same as MP5300
10	035032260	Tension Pulley		4	Same as MP5300
11	509000014	X Motor	TS3747N31E3	1	Same as MP5300
12	035132200	X Drive Shaft	M Shaft 53	1	Same as MP5300
13	380000057	Coupling		1	Same as MP5300
14	035032341	Drive Pulley	20P2M4BF	2	Same as MP5300
15	311605068	Drive Shaft Bearing	F625ZZ	1	Same as MP5300
16	353513001	Bush 5 x 4.5		1	Same as MP5300
17	353513002	Bush 4 x 5		1	Same as MP5300
18	359800008	Bush 4 X 5		1	Same as MP5300
19	035132210	X Belt 1820		2	Same as MP5300
20	035132160	Tension Bracket, Front		1	Same as MP5300
21	035132170	Tension Bracket, Rear		1	Same as MP5300
22	035132190	X Limit Bracket		1	Same as MP5300
23	035130102	Side Cover		1	Same as MP5300
24	035135041	Cover, Rear A		1	Same as MP5300
25	618260100	Writing Panel Base		1	
26	773513080	Relay Board	PR05406	1	Same as MP5300
	508000015	X Home Sensor	GP1A53HR	1	Same as MP5300
	105401150	Y Home Sensor Assembly	CS, 05410	1	Same as MP5300
	508102285	Y Home Sensor	SW, SPPB-TYPE1	1	Same as MP5300
27	691801520	X Flat Cable	FPC, 05410	1	Same as MP5300
28	031000110	Pen Station		1	Same as MP5300
29	020000232	Magnet		8	Same as MP5300
30	053200240	Pen Cap Spring		8	Same as MP5300
31	053200330	Pen Cap Rubber		8	Same as MP5300
32	053200321	Cap Base		8	Same as MP5300
33	054026020	Support Plate		1	Same as MP5300
34	035136020	Pen Station Bracket		2	Same as MP5300
35	795320706	Pen Station w/Magnet		1	Same as MP5300
36	795320716	Pen Station Assembly		1	Same as MP5300
37	518110070	Control Panel Flexible Cable Filter	ESD-FPL-34	1	Same as MP5300

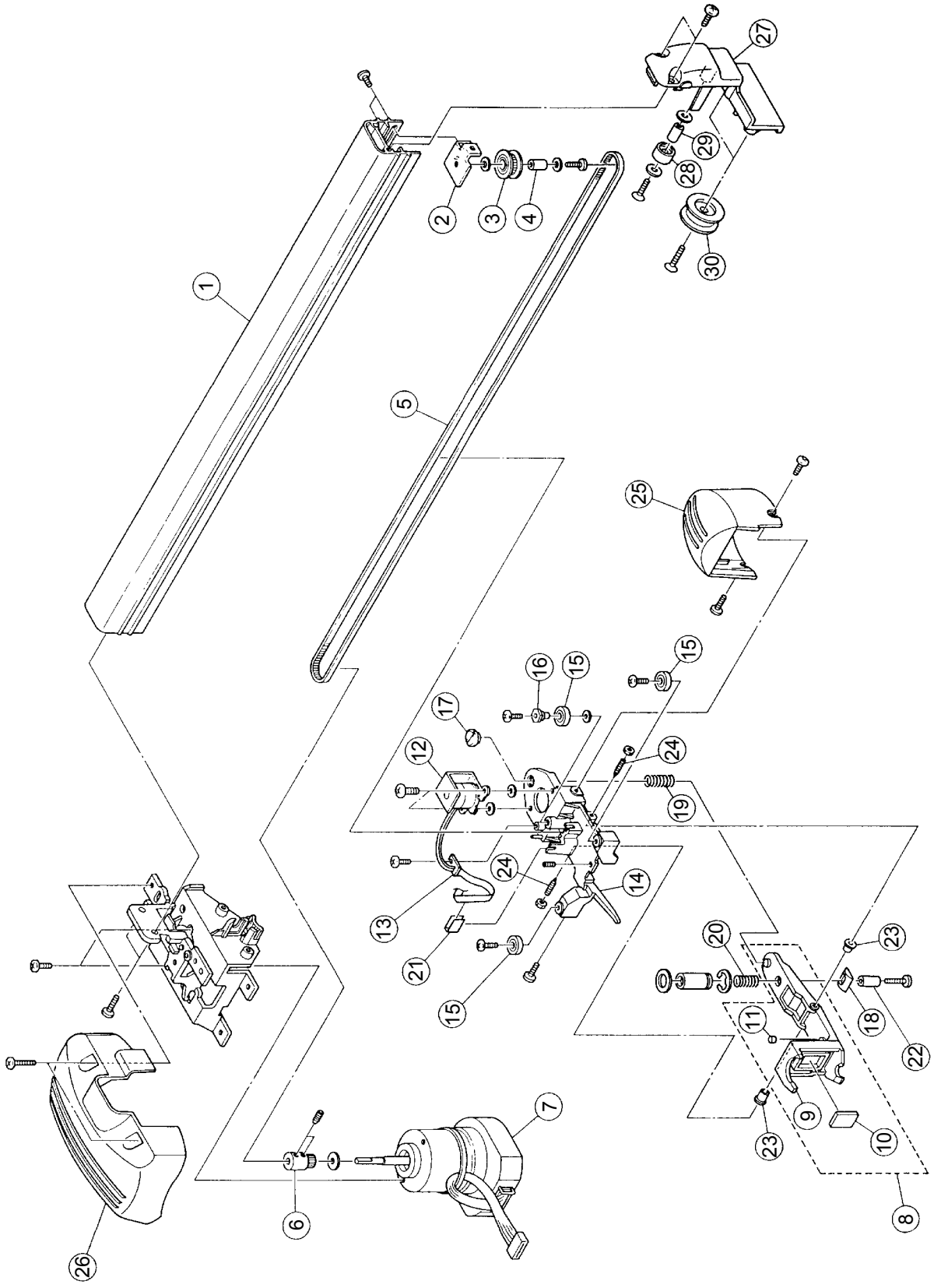
X-Axis Slider, X-Axis Drive, Pen Station



9.6 Y-Axis Slider, Y-Axis Drive

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	035133012	Y Bar		1	Same as MP5300
2	035133020	Y Pulley Mounting Plate		1	Same as MP5300
3	035133031	Y Pulley 12		1	Same as MP5300
4	035133040	Y Pulley Shaft		1	Same as MP5300
5	035133050	Y Belt		1	Same as MP5300
6	035133102	Drive Pulley 10		1	Same as MP5300
7	035132230	Y Motor	TS3747N32E3	1	Same as MP5300
8	773513100	Pen Holder Assembly		1	Same as MP5300
9	035134072	Pen Holder		1	Same as MP5300
10	020000232	Magnet		1	Same as MP5300
11	035034081	Solenoid Support Rubber		1	Same as MP5300
12	509000035	Solenoid	J119-189	1	Same as MP5300
13	105401090	Pen Flexible Printed Cable	FPC, 05401	1	Same as MP5300
14	035134013	Y Slider		1	Same as MP5300
15	035134081	Y Roller 10B		3	Same as MP5300
16	031004330	Y Roller Spindle		1	Same as MP5300
17	035134020	Pen Force Adjustment Screw		1	Same as MP5300
18	035134090	Pen Holder Spacer		1	Same as MP5300
19	035134041	Pen Up Spring		1	Same as MP5300
20	035134100	Plunger Spring		1	Same as MP5300
21	052113610	Y Flexible Printed Cable Holder		1	Same as MP5300
22	353513005	Bush 3 x 9.5		1	Same as MP5300
23	303100003	Pivot Bearing		2	Same as MP5300
24	031004540	Pivot Bearing Screw		2	Same as MP5300
25	618264150	Solenoid Cover 303		1	
26	035132061	Y Motor Cover		1	Same as MP5300
27	035132050	Y Bar Cover		1	Same as MP5300
28	035132070	Y Slider End		1	Same as MP5300
29	035132120	Y Roller Spindle		1	Same as MP5300
30	035032260	Tension Pulley		1	Same as MP5300

Y-Axis Slider, Y-Axis Drive



9.7 Standard Accessories

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	500051951	AC Adapter	SA45-3129	1	For all countries
2	500052004	AC Power Cable 100V JAPAN	361-70100020-01	1	Depends on the country
	500052350	AC Power Cable UL	UC-671-N03	1	Depends on the country
	500052402	AC Power Cable CEE	EN-514-N04	1	Depends on the country
	500052397	AC Power Cable BS	BS89/3-C7-1.8m	1	Depends on the country
3	053139013	Tilt Stand		2	
4	035139020	Plastic Cover		1	
5	031009020	Paper Alignment Labels		1	
6	031000070	Rubber Foot for Tilt Stand		4	
7	500052043	USB Cable	CBL0106-1.5M	1	
8	618269350	CD, User's Manual	MP303-CUG01	1	
9	618269380	Quick Manual	MP303-UM-851	1	
10	982000070	Ceramic Pen	HC503P-BK	1	

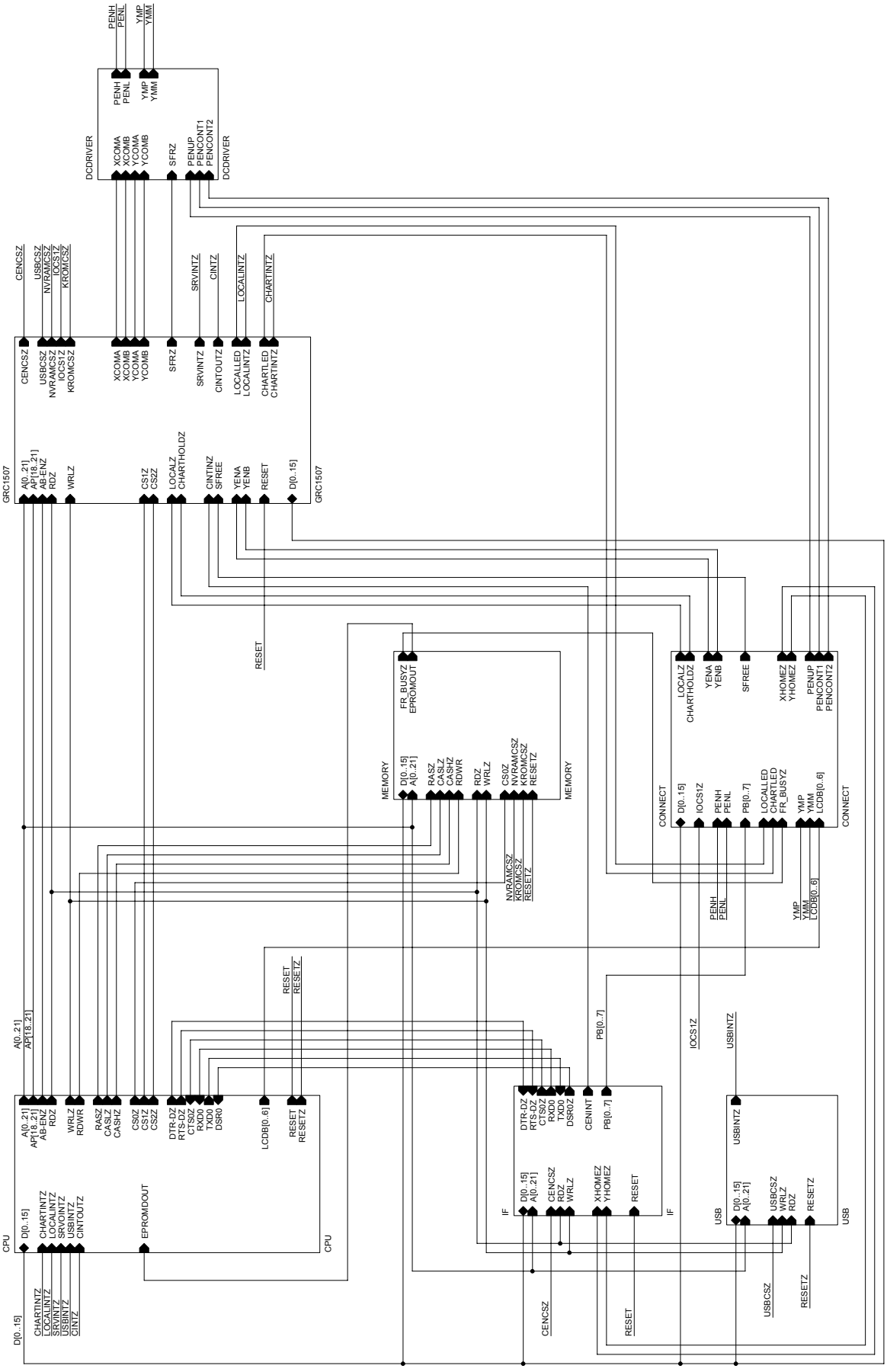
9.8 Others

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	618269100	Packing Box for MP303		1	

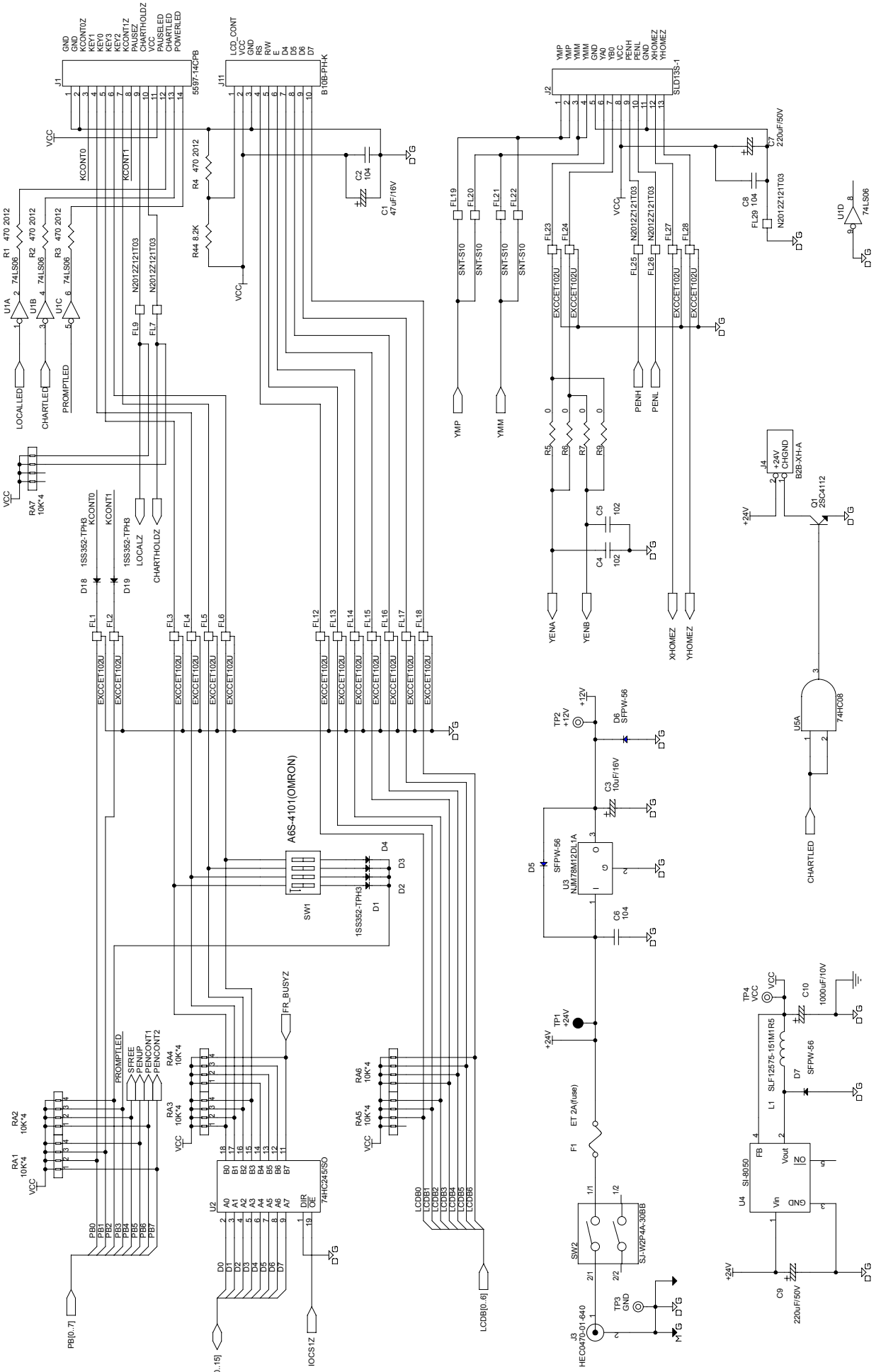
10. CIRCUIT DIAGRAMS

10.1 Main Board

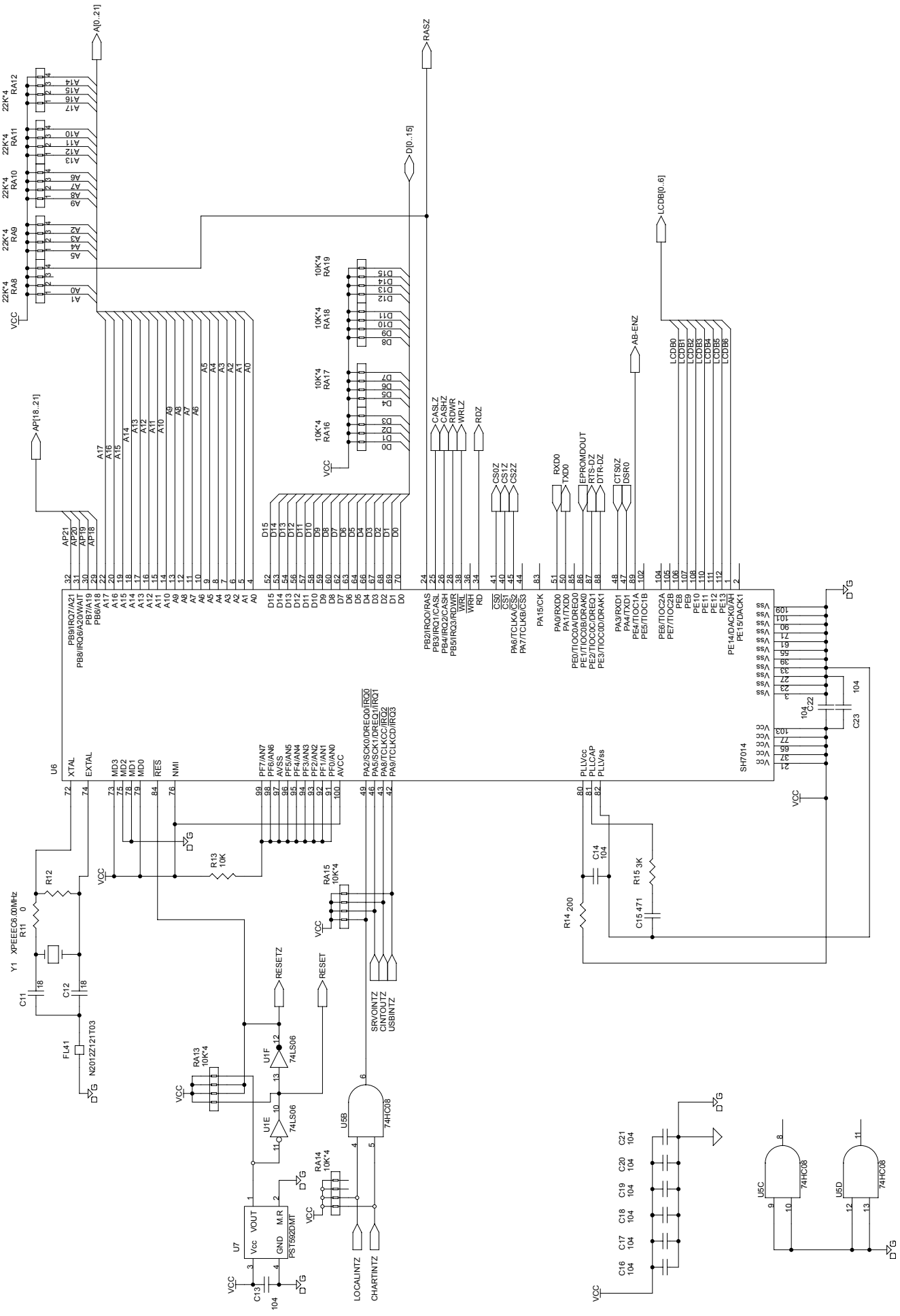
Main board (Top)



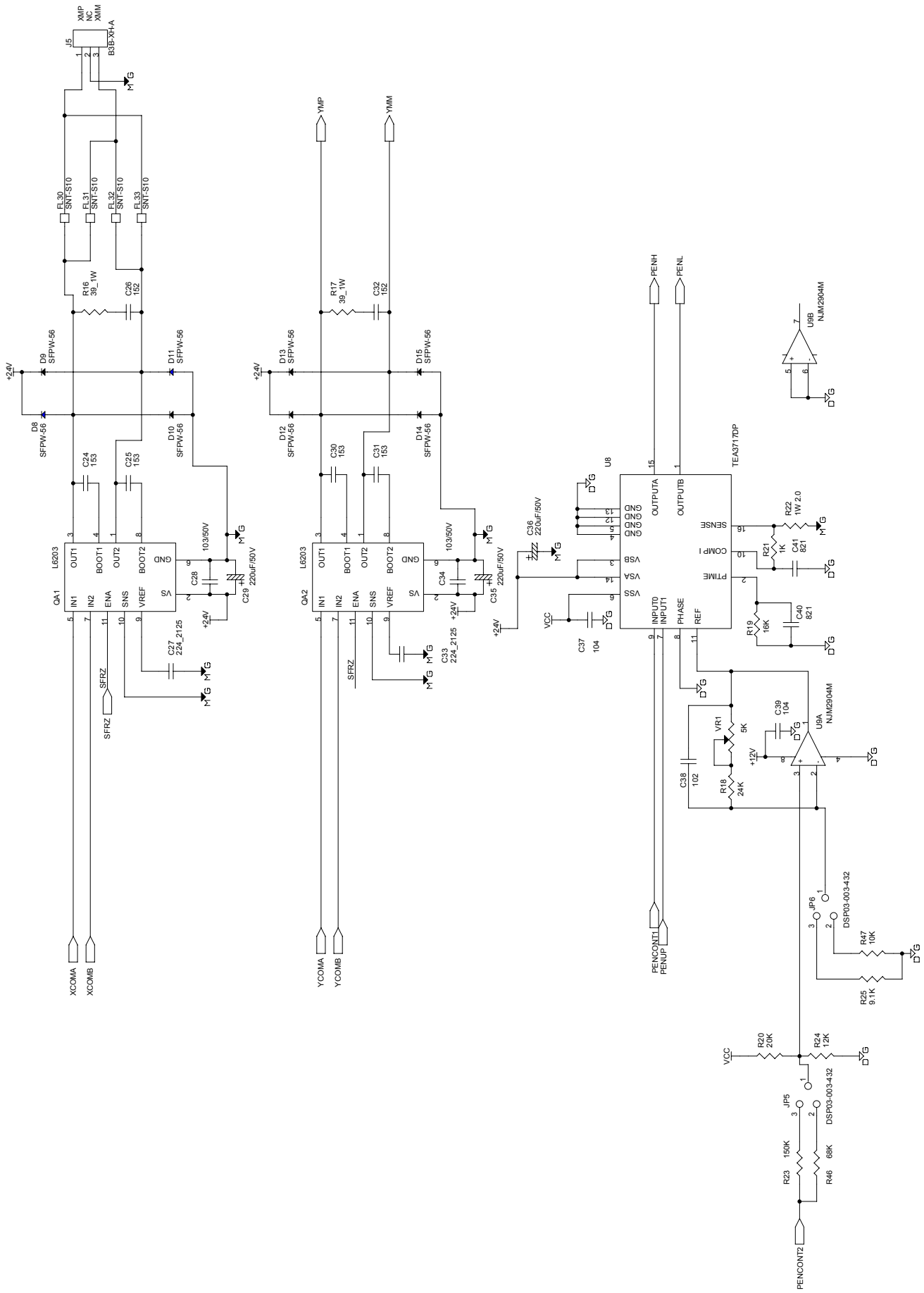
Main board (Connections)



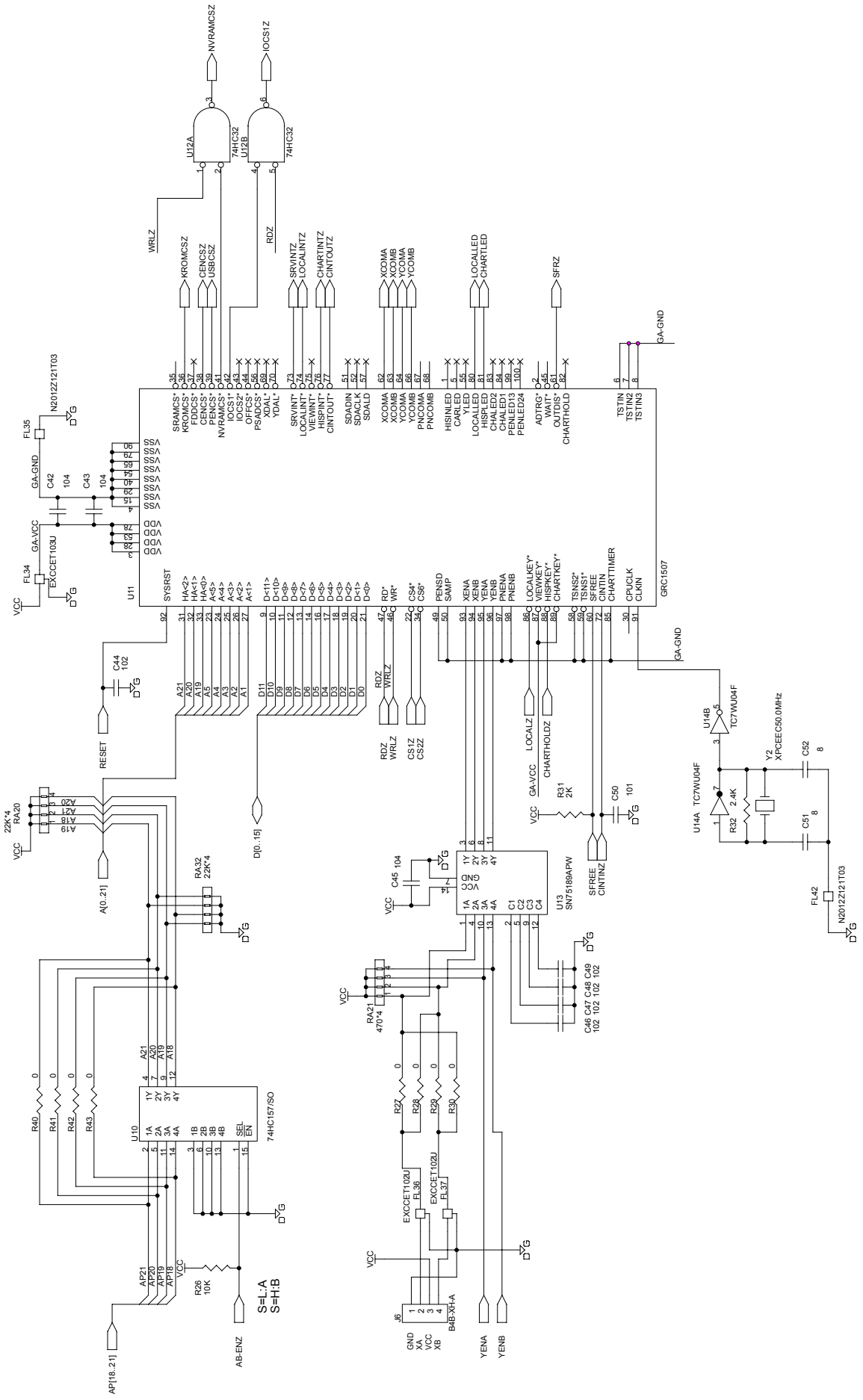
Main board (CPU)



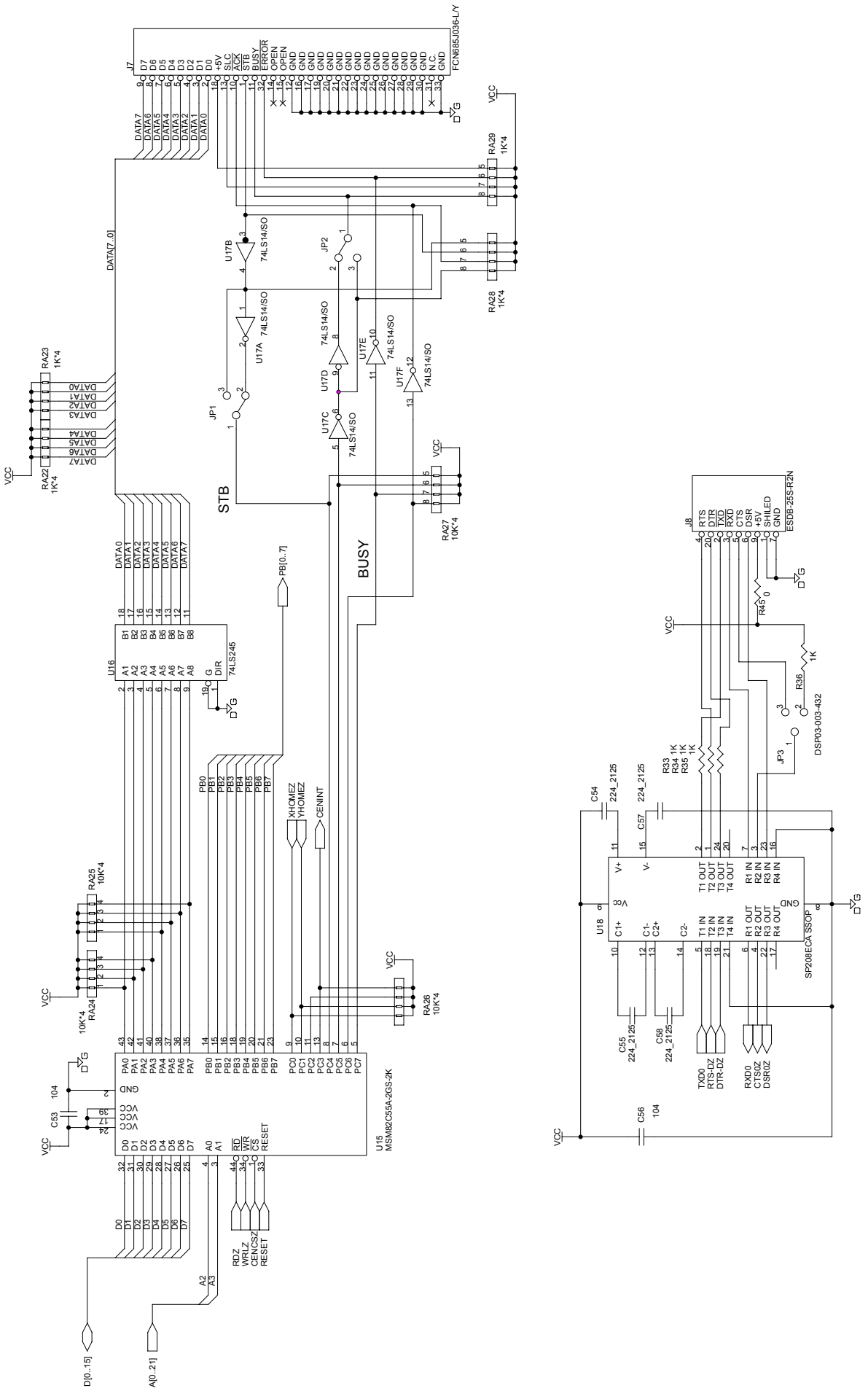
Main board (DC Driver)



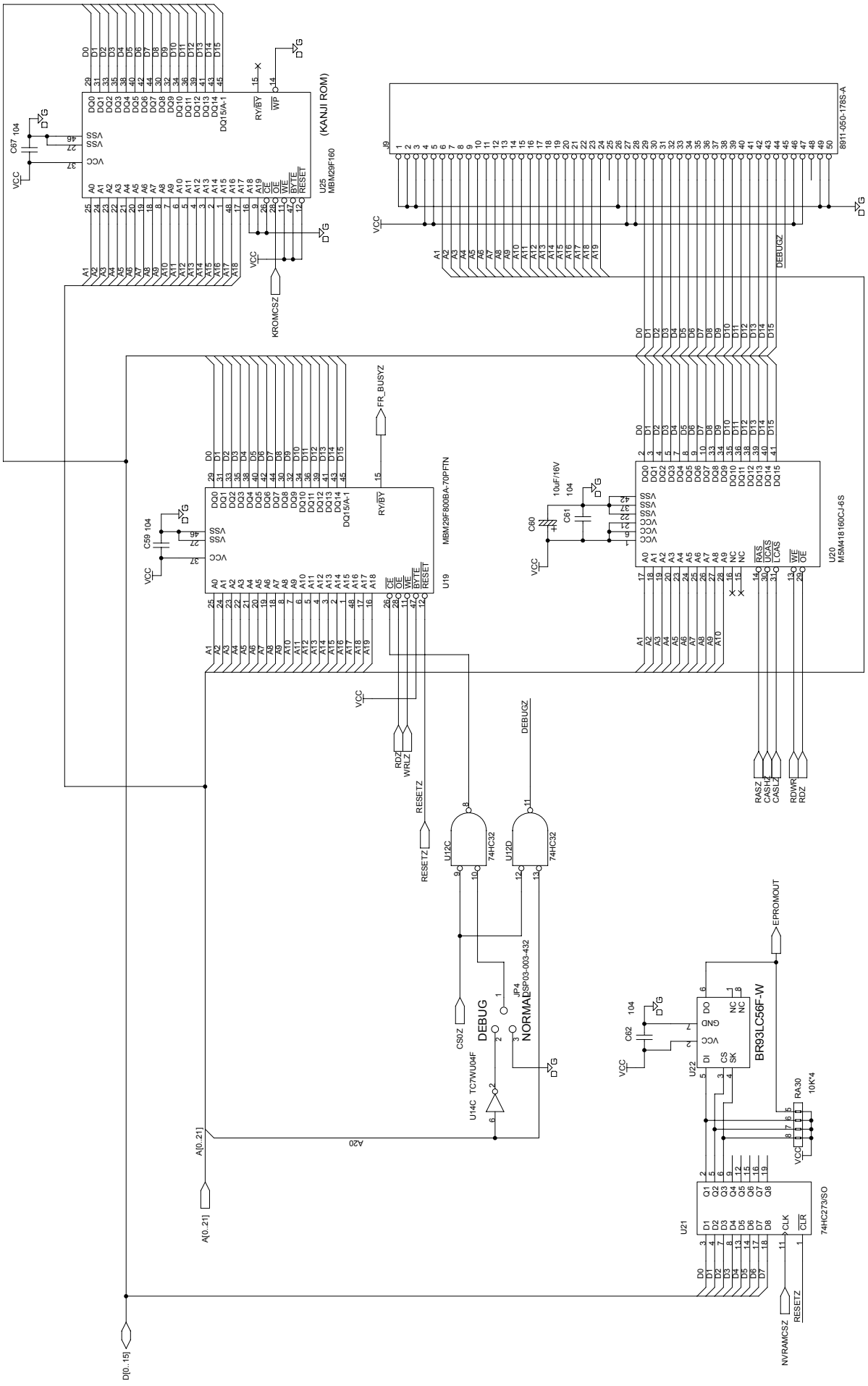
Main board (GRC1507 Servo)



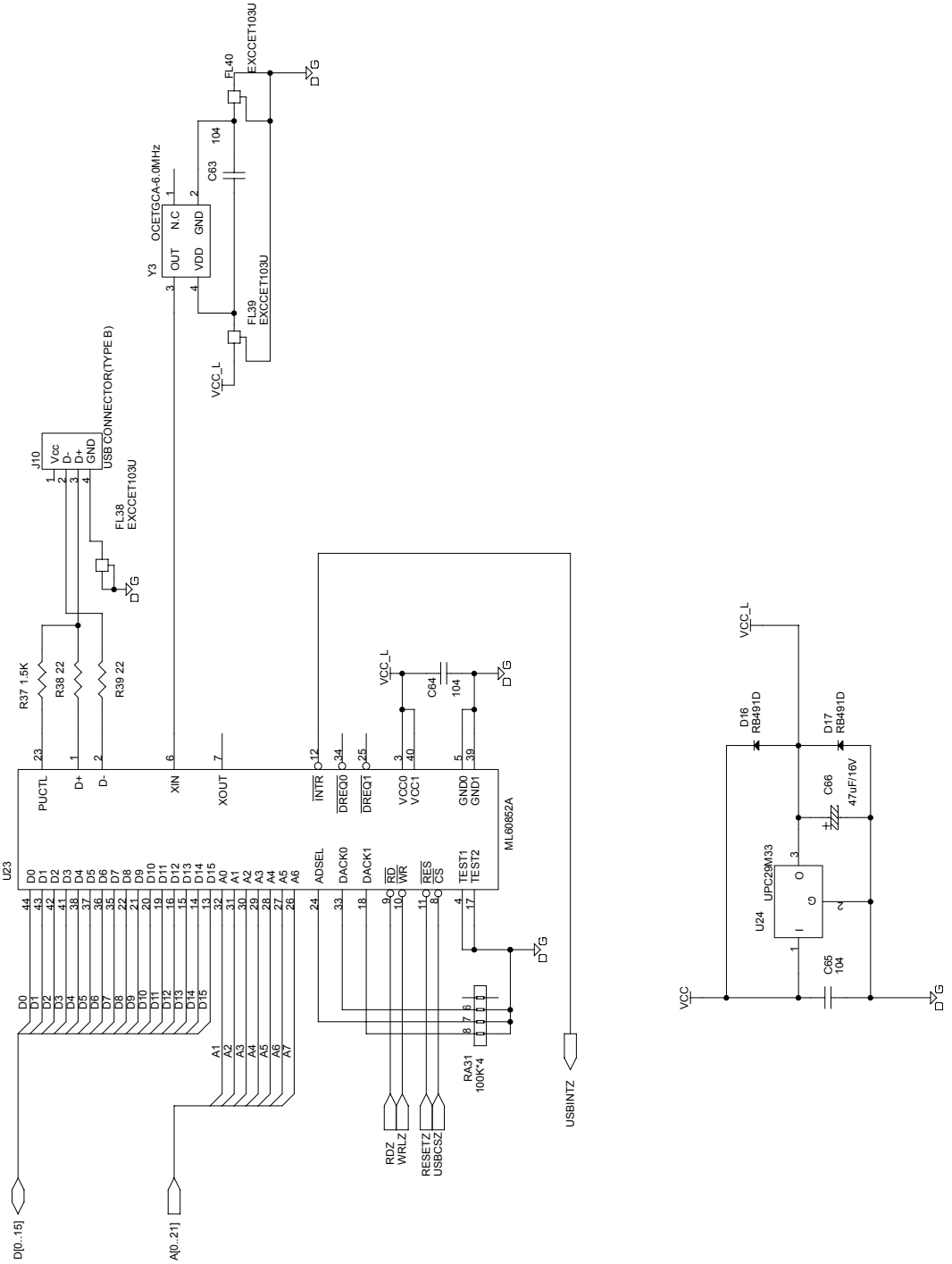
Main board (I/F)



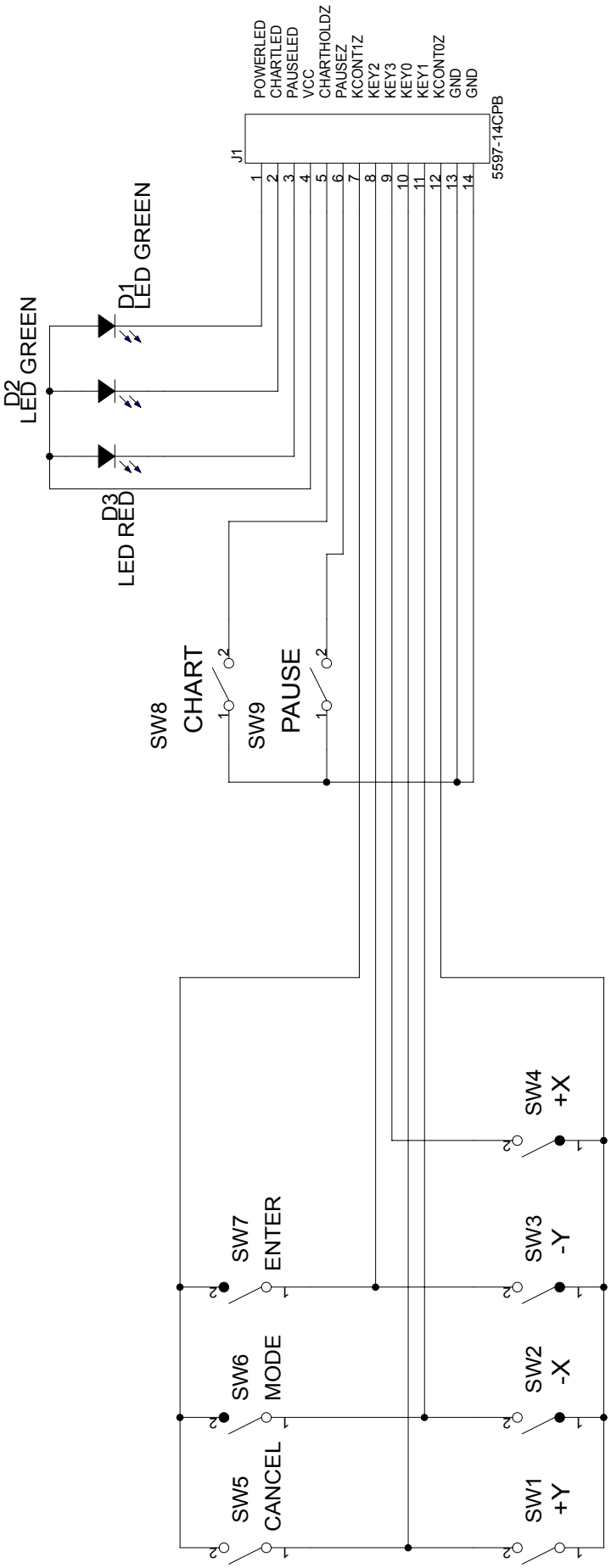
Main board (Memory)



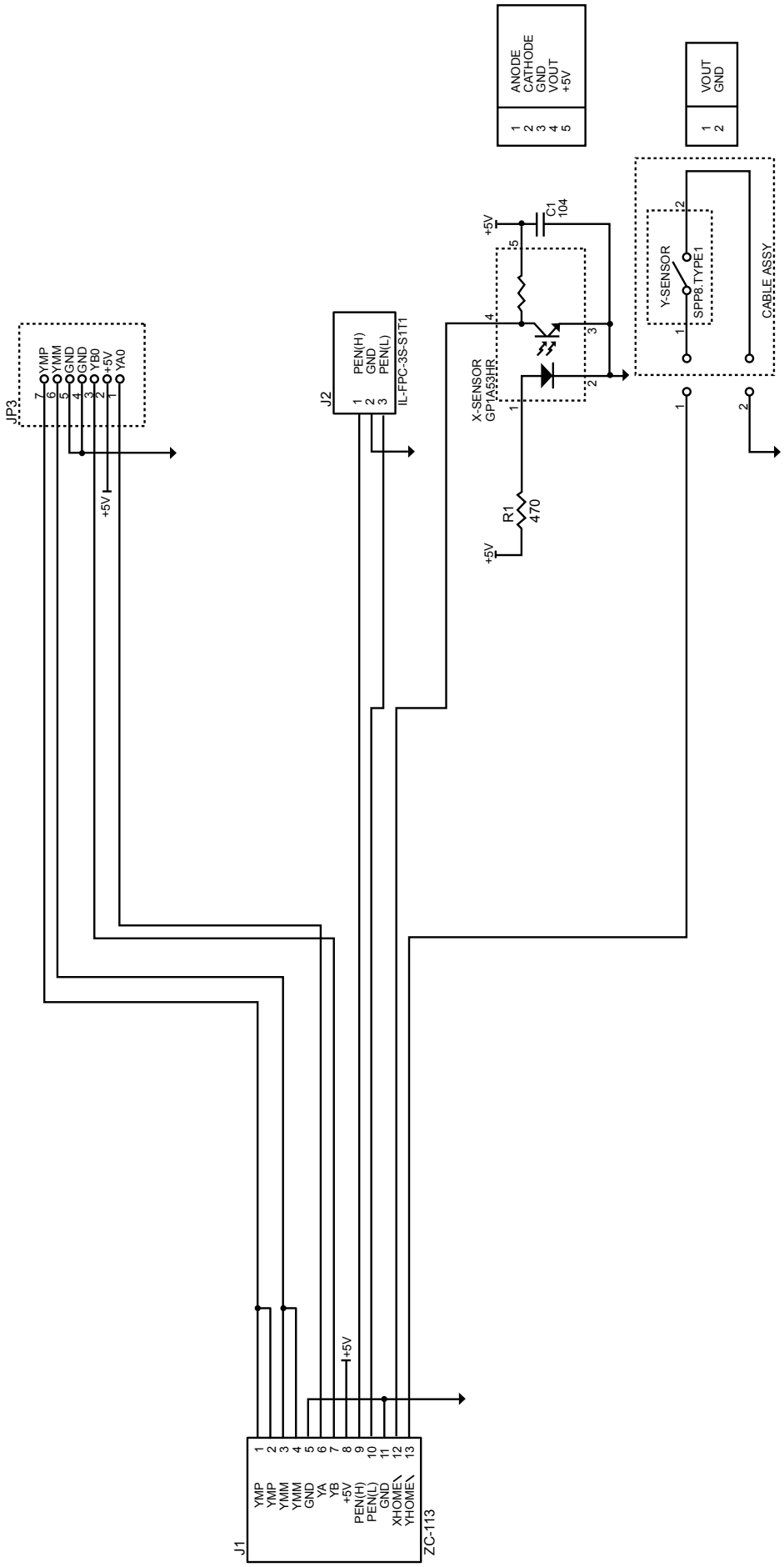
Main board (USB)



10.2 Control Panel



10.3 Relay Board



10.4 High Voltage Power Board